359

PEOPLE'S HEALTH

OFFICE OF THE REGISTRAR OF BOOKS
16 JAN 1950
MADRAS
135/1-50

EDITOR
A.V. RAMAN

RE. ONE

VOL. IV DECEMBER 1949 NO. 3

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MALARIA—THE MENACE THAT MATTERS

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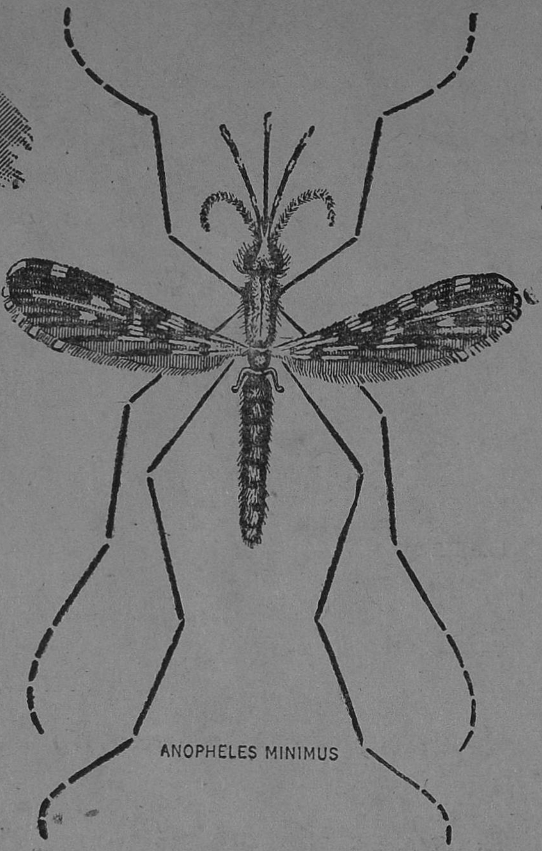
ANOPHELES MINIMUS



DESCRIPTION

Tips of hind legs not white. Femora and Tibiae not speckled. At least 4 dark spots on Costa and 1st longitudinal vein. Tarsal segments of forelegs unbanded. Third longitudinal vein entirely pale. Palpi of female with two pale distal bands both broad separated by a dark band of equal width.

SPHERE OF INFLUENCE

Foothills of U.P. Bengal: Assam: Burma: Indo-China: S. China.

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PEOPLE'S HEALTH

A Pioneer in the Field of Public Health

Vol. IV DECEMBER, 1949 No. 3

OFFICE OF THE REGISTRAR OF BOOKS
16 JAN 1950
MADRAS

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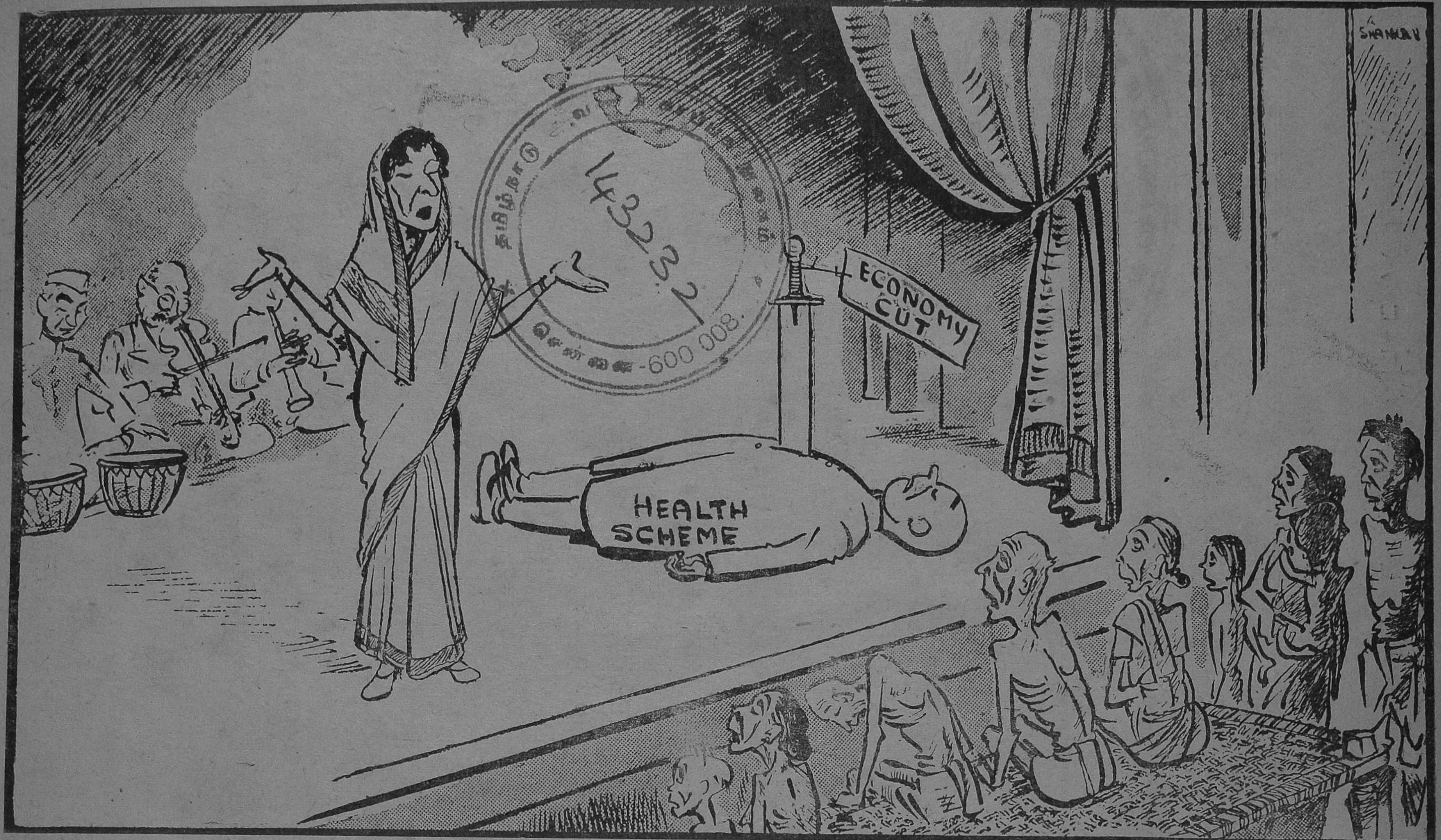
ONE ACT TRAGEDY.



"Drama plays a great role in the life of a country", said Rajkumari Amrit Kaur inaugurating the Indian Drama Conference in New Delhi.

Courtesy—*Shankar's Weekly*.

PEOPLE'S HEALTH

VOL. IV No. 3 **DECEMBER, 1949** ISSUED MONTHLY

EDITORIAL . . .

Measure thy life by loss instead of gain;
Not by the wine drunk, but the wine poured forth;
For love's strength standeth in love's sacrifice;
And whoso suffers most hath most to give.

—*H. E. KING.*

CASHING IN SACRIFICE

Sacrifice in the country's cause should not be cashed in at the political counter. Indeed, if reward was expected later, then those who 'suffered' cannot by any means be considered to have "*sacrificed*" at all. Sacrifice is one which is undergone for the love of service to the country or its cause. Sacrifice should not be an investment. Our Government have gone to the extent of giving special consideration to such *Tyagis* even in government employment. We do not grudge the sufferers being put on their feet. But the Government should at the same time understand that a large number of permanent servants have also sacrificed their future and suffered untold persecutions. There are officers who stood upto the ideals of the Congress without being official congressmen and reflected that spirit of service to the country in the discharge of their public duties. The foreigners who were then running the administration like sharp-shooters, caught hold of them and attempted to strangle them. It is to the credit of those permanent servants that they have not come forward to advertise their sacrifices and demand some consideration being shown to them by our present government. Is it not the obvious duty of those in authority to find out such men and utilise their services in the best interests of the country? We do not put it forward as a reward for sacrifice or suffering. We put it on the simple

ground that our country wants efficient and patriotic men to be permitted to do their bit of service to the country and not be condemned to overpowering frustration.

LESS INFECTION: MORE PUDDING

Hotel employees in conference recently resolved to demand minimum wages and other privileges for themselves, which amounts to asking for more. We heartily commend their demand, as it is high time that workers get their hire, not merely sufficient to keep body and soul together, but also to afford decent living. To be worthy of the hire, the workers should also show by their work that they deserve what they demand. The present-day tendency among workers 'to go slow' is anti-national. The workers should show by their honest and whole-hearted work that they are out to put forth their maximum effort in their respective fields of work.

The culinary art as a profession has many devotees in whose hands is entrusted the fulfilment of our gastronomical ambitions. Hotels have come to stay in society and cooks, very much more so. Their demands must be treated as commands, and the necessary sum augmented to their pay-cheques. The meal-house managers have nothing to lose, and probably something to gain; for the resultant increase in the prices of viands, may not be quite proportional to the additional expenditure incurred! The burden falls on the poor man who flees to the restaurants for the satisfaction of a hunger, unappeased by loud remonstrances from an ill-tempered wife. But he will bear it as he has borne much else; the last straw is yet to come.

However, a conditional clause must be inserted in our support to the hotel employees' demands, which like Mr. Kamath's to our Indian Constitution Act, is 'not entirely unqualified.'

POTENTIAL DISSEMINATION OF DISEASE

It must be reiterated that cooks and servers are potential disseminators of disease. Unless they make another resolution promising to learn and to follow the recognised rules for the health and hygiene of food-handlers, their demand for a minimum wage might go unheeded. Epidemics of typhoid and dysentery, not to mention other gastric ailments, can be traced to hotels, whose sanitation leaves much to be desired. Our cooks and *chefs* must submit to physical examination as often as may be considered necessary. They should abstain from their public duties on the symptoms of ill-health setting in. This would positively improve the conditions in which

customers take in their food and thereby minimise infection. Our cooks must guard their health with as much vigilance as they watch their purses. If, by refusing the cooks' demands, we run the risk of swallowing some cyanide with our coffee, we must not forget the equally unhappy end by contracting typhoid and the like from a hotel, whose sanitation is sub-standard, but whose servers are satisfied! The hotels themselves must do something about their general sanitation which at present is far below the normal standards expected of eating-houses. We have from time to time been publishing articles and extracts which throw ample light on the subject. The hotel-keepers and hotel-managers would do well to know them and to put them in practice. This would be for the mutual advantage of the management and the public. Both the cooks, asking for minimum wages after the western fashion, and the hotel-keepers, keeping an eye on the counter, would do well to understand that hotels elsewhere are maintained with absolute and impeccable cleanliness. Minimum wages and other amenities for such maintainers of hotel hygiene would be amply justified. Will our cooks clamouring for more money, pay some heed to their own health and the safety of the public? Let us call it a deal—Less infection, more pudding!

WHAT OUR LEADERS CAN DO?

Public men in authority are usually invited to open restaurants, eating-houses and similar other institutions. Our leaders should lay down a firm condition that they would agree to participate on such ceremonial occasions only if the premises have been specially built suited for the trade satisfying all requirements of comfort, convenience, health and sanitation. If they do so, much improvement could be effected in restaurant sanitation. Far from doing a public service of this kind, if a person in position opens such institutions, he only keeps the evaders of municipal rules and regulations to escape scot-free; for, no municipal officer dare take action against any offenders when a higher authority had already extended patronage to them!

SELF-HELP

The present financial crisis has practically passed a dagger through all programmes calculated to promote the health of our people. From the Government of India down to a local panchayat, all are perturbed over the situation. Should we then sit with folded hands pending an improvement in the financial position of our country? An emphatic 'No' is the reply.

There are schemes by which the improvement could be effected, such as control of certain trades and occupations which are considered dangerous to public health. Let us first lay down

the requirements clearly and definitely. And then take effective steps to enforce them in practice. This step would go a great way towards promoting the health of the people. Let us make people, who make money from the public, spend a *fraction thereof* to improve the amenities of those who patronise institutions like the cinematograph halls, music halls and the like. There is no good of talking about the control of aerial infection, without at the same time taking steps to ensure the sanitation of the places of public amusement.

LOCAL FINANCE TO PROVIDE LOCAL REQUIREMENTS

Next, let us take another example, the provision of water supplies and improvements to existing ones. Money is no doubt required. Without money little can be achieved. But it should also be realised at the same time that money could be found from sources which have not been tapped hitherto. As the Madras Finance Minister recently announced, the people should be appealed to provide funds for executing works of essentially local character. The Government can take such legal steps as may be necessary to permit the local authorities to issue *local bonds* redeemable in a definite period and ear-marked for a definite purpose. The local enthusiasm could be so worked up as to induce people to contribute their mite towards the realisation of so vital a necessity as protected water-supply. *Per contra,* those who are not out to try new ideas, may quote the precedent of Bombay municipal loan. What we are talking about is a very different matter. We visualise the issue of local bonds redeemable in a certain number of years, bearing a certain percentage of interest. Perhaps, all our municipal councillors and other prominent citizens should make it a point to go about and sell these bonds, house to house, explaining the good purpose behind it. We have no doubt, in our mind, that if a genuine and honest attempt is made, local enthusiasm could be worked up to such a pitch as to secure the required loan.

We would therefore appeal to one and all to realise the present financial stringency and to help themselves by untying their purse strings to such public utility works of primary importance, as water-supply, drainage, slum clearance and other kindred improvements.

We would also appeal to our Ministry to take such steps, legal and administrative, as may be necessary to help the people to help themselves. We would suggest that, in the first instance, an attempt in this direction, may be made in Coimbatore, Madras and Trichinopoly Municipalities.

The principle underlying this proposal is applicable all over our country. A countrywide propaganda could be undertaken.

HEALTH AND ENVIRONMENT

by

Our Study Circle

This is the third of the series of articles. We need hardly remind our readers about the aim we have in view in publishing this series.

We welcome suggestions from our readers to make these articles more useful. We shall gladly incorporate their suggestions in these articles.

—Ed., P.H.

ADULT LITERACY CAMPAIGN AND HEALTH EDUCATION

In the promotion of adult literacy, emphasis is laid on their education to enable them to follow national and international affairs. Such intelligent understanding, it is said, would help them to choose the fittest persons for the proper and efficient administration of the country. To put it bluntly, politics seem to me to be the only end and aim in view. So far, not a word has been whispered by those in authority that an important plank in the adult education programme includes education on health. It should be made perfectly clear that in imparting education to the adults, the curriculum should be so framed as to inculcate ideas of health and sanitation to the adult illiterate. This series has in view the education of illiterate adults in the ways of the laws of health.

THE SAD OLD STORY

From 1859 down to the present day, considerable lip sympathy has been expressed with improving the sanitary conditions of our country. A Royal Commission was appointed in 1859 to report on the sanitary state of the *Army in India.* It should be noted that the object of the committee was to improve the living conditions of the *Army and not of the people.* This Commission reported in 1863. It recommended the appointment of a Sanitary Commission in each of our major Presidencies. The Commission was to give advice and assistance in all matters relating to public health and to exercise supervision over the sanitary condition of the people, both European and Indian. The Royal Commission made it clear that the primary task of these Provincial Sanitary Commissioners should be to endeavour *to diminish the sickness in the Army.* And the Royal Commission recognised that this would involve:

(1) The sanitary improvement of Indian towns: *Because the Army moved in the towns,* they apparently wanted to make sure that the insanitary conditions of our towns did not cause ill-health in the Army.

(2) Prevention and mitigation of epidemic diseases: Here, again, the object was *to protect the Army* against the ravages of epidemics which might break out among the people.

(3) Constant observation of the sanitary condition of the population and report on the

prevalence of sickness: This is again not in the interest of the people; but in the interest of the Army stationed in the country!

(4) Construction of works for drainage and water-supply.

(5) The proper carrying out of sanitary rules and regulations.

(6) Preparation of the Code of Rules adapted to the special sanitary requirements of the Army and of the civil population.

(7) Submission to the Government of India of all plans for supervision of the sanitary administration in each of the Provinces.

Such Commissioners were appointed in 1863 in Bengal, Bombay and Madras. The Provincial Sanitary Commission consisted of one Civilian as President, with two medical and two military officers—one an engineer and the other, a medical officer. The medical officer was made the Secretary of the Commission.

The Government of India were expected to exercise a general supervision and control over the entire sanitary service through these Provincial Commissions. The Bengal Commission was dissolved, soon after it presented its first report. In its place, the post of Sanitary Commissioner was created. He was given a secretary, and was empowered to constitute expert committees as and when necessary. The Government of Madras and Bombay were directed to follow suit.

RESPONSIBILITY FOR SANITATION THROWN ON SLENDER SOURCES

The Royal Commission, in their report of 1863 (four years after its appointment), made proposals for a comprehensive system of administration of sanitation problems of our towns and districts under civil authorities. The Commission took care to lay stress on the necessity for discretion in the application of measures, the value of which people might not appreciate. The Commission emphasised that *sanitation was essentially a local and municipal concern. They also took care to recommend that the cost of sanitary works and service be borne by local funds.* The Government of India were to assist financially only for "centrally supervising and controlling establishments." Thus, it would be clear that practically from the very beginning, the responsibility for so vital a subject as sanitation was thrown on ill-equipped, poverty-stricken and often malformed local authorities, by the foreign administration of our country.

OPENING FOR NEW POSTS

The Government of India did not favour any general sanitary system, owing to the financial and administrative difficulties of introducing it into the country at that time! Eventually, a scheme was proposed in 1867. And what was the scheme? It provided for separate Sanitary Inspector-Generals, later designated as Sanitary Commissioners for each of the 'non-presidential Governments'. Their position, duties and relation to the Sanitary Commissioner with the Government of India, were also laid down.

By 1869, there was a Sanitary Commissioner and a Statistical Officer with the Government of India, and separate Sanitary Commissioners for Madras, Bombay, Bengal, North-Western Province and Oudh, Punjab, and Central Provinces. It was made clear *that their duties were purely advisory.* To put plainly, a number of expensive new posts were created with only *advisory functions.* It is scarcely necessary to point out that the finances of our local bodies would not admit of the *valuable technical advice of these high functionaries* being put in practice.

THE NEXT STAGE

The next *development* was the re-organisation of the central medical administrative staff. This was done in 1877. Vaccination was transferred to the control of the Sanitary Commissioners in 1880. The then existing Superintendents of Vaccination were designated as Deputy

Sanitary Commissioners. In 1888, in view of local self-government legislation, a resolution of the Government of India, laid down that "*the promotion of sanitation should be regarded as one of the most important duties of local bodies and all village units.*" It should be specially noted how the responsibility has been transferred to the people themselves!

With a view to guiding, controlling and stimulating local bodies to shoulder their responsibility, the Government of India proposed the formation, in each province, of a sanitary board. The Board was composed of an officer of administrative experience, the Provincial Sanitary Commissioner, an officer of the Public Works Department, skilled in sanitary engineering, one or more non-officials appointed by the local Government and the commissioners of divisions as *ex-officio* members for questions connected with their charges. Sanitary boards were formed in every province, excepting in Bombay and Madras, where the board consisted merely of the Sanitary Commissioner and a Sanitary Engineer; in Madras, the Chief Engineer, P.W.D. was later on added as its President. Who is to foot the bill? The formation of *boards*, the creation of new posts and the like is the technique adopted in the administration of our country; even now, in Independent India, the old *technique* is practised in a new form. The people are doped by such technique.

Let us not pursue further this sad history of sanitary reform in our country.

A FAMOUS RESOLUTION

The year 1888 is an important landmark in the sad history of sanitation in our land. It was in that year, the Government of India passed a famous resolution. To understand the implication of their resolution, it is necessary to quote it *in extenso*. It runs as under:

> "The practical applications of sanitary principles to towns and villages in India has, since the publication in 1863 of the report of the Royal Commission on the sanitary state of the Army in India, received the continuous attention of the Government. The report of the Royal Commission, the reports submitted subsequently from time to time by the various provincial sanitary commissioners and the suggestive reviews of those reports which have emanated from the Army Sanitary Commission in England, have brought to notice the chief sanitary defects of urban and rural areas, and have indicated the methods by which they might be remedied.
>
> "It is through no want of sympathy with the cause of sanitary improvement that the Government of India, has not been able hitherto to give as full effect to these recommendations, as it could have wished.
>
> "The difficulties to be overcome were numerous and formidable and lay, to begin with, *as much in the ignorance of the people and in the passive resistance offered by them to all departures from the practice of ages, as in the want of funds and the absence of executive agency to give effect to the order of the Central authority.*
>
> "However convinced the Government of India might be of the value of the suggestions made for its adoption, and however anxious to carry them into effect, it has to proceed with circumspection, and with due regard to the means at the disposal as well as to the prejudices of the heterogenous populations entrusted to its care.
>
> "Under such circumstances, progress has unavoidably been slow. Still considerable progress has been made.
>
> "The ignorance of the people on all sanitary questions has been in some measure mitigated by the Department of Public Education, which has imported into the

ordinary school curriculum instruction in the elementary principles of sanitary science.

"Popular prejudices have been combated by the judicious influence of the officers of Government and by the introduction of improved sanitary methods, wherever this was practicable.

"Sanitary Commissioners have been appointed in all Provinces ; information regarding their sanitary needs of towns and later of rural areas, has been collected ; and in many municipalities and some rural areas, this information has been turned to account in the provision of a pure water supply, of improved drainage, and of better conservancy arrangements. . ."

This resolution on the face of it is calculated to tell the world at large that the Government of India or rather the foreign rulers, were really doing everything possible, despite difficulties, to improve the sanitary living conditions of our people. The difficulties in their way are said to be that our people are *ignorant*, *apathetic*, *superstitious* and so on. It gives an impression as though efforts were really made to improve the sanitary conditions of our towns and villages and that our heterogenous society resisted such attempts ! The inclusion of subjects relating to health and sanitation in the curriculum of our elementary schools was but an eyewash. Indeed, judged from the sanitary conscience of our educated people, even to this day, one should be impressed by the poor results derived by merely including the principles of sanitary science in the curriculum of our elementary schools.

MORE PAPER RESOLUTIONS !

The then Health Officer of Calcutta Corporation read a paper in 1894 at the Calcutta Medical Congress. The lead given by him led to the issue of another *paper resolution* by the Government of India in October 1895. In this resolution, the Government of India asked the Provincial Government to formulate proposals on specific lines for the re-organization of the sanitary department. This is, again, a move to throw responsibility on the local Governments. Ordinarily, a coordinated direction by the centre on some uniform standards should have been issued.

In another resolution, dated March 1898, the Government of India gave their opinion on the scheme of reorganization and laid down to the extent to which they then believed reform was possible. It would strike any one how step by step, the Government of India have been fighting shy of their own responsibility and attempted to throw it on local Governments. The local governments, in their turn, transferred it to the local authorities. This is the way in which the problem of sanitation was being tackled. What was the ultimate result ? None whatever. Lack of finance as usual, was put forward as an excuse. The situation, therefore, remained stagnant from 1863 to 1904.

WHAT HAPPENED THEN ?

In 1904, the Plague Commission advocated the reconstruction of sanitary department on a wide all-India basis. Again, a move to create more and more appointments ! It only costs more and more money to the half-famished people who toil in their fields. One of the immediate results of the report of the Plague Commission was that the office of the Sanitary Commissioner to the Government of India, was separated from that of the Director-General, Indian Medical Service. This happened in 1904.

Rather a prompt action ! And why the creation of another fat appointment ? And what is the main function of the new Saitary Commissioner ? It was to advise the Government of India upon sanitary and bacteriological questions !

(To be continued)

CONGRESS EXHIBITION, MADRAS

HEALTH SECTION

by

A. V. Raman

Arranging an annual exhibition under the auspices of the Tamil Nad Congress Committee, has become a regular EVENT! The aim of such exhibitions is to educate public opinion on the progress made in industry, agriculture, health and other such activities. These exhibitions focus public attention on the work which has been done towards promoting the general public welfare. People will be profited by visiting them. Incidentally, they may derive the pleasure of hearing music, seeing dramas and other recreations usually provided in the exhibition grounds.

GANDHIJI'S STATUE

The entrance to the exhibition is unprepossessing. A poorly lighted facade with a *cutcha* dark dome and a base corrugated screen greets the visitor. The citizen who remembers the well-got-up attractive facade of last year starts with a disappointed feeling. We have architects among us, who would have willingly co-operated with the exhibition authorities, had they been approached. This disappointment mounts to resentment as the visitor on entering, sees the way in which the statue of Mahatma Gandhi has been left in a dark area, in sharp contrast to the bright illumination of the stalls in the immediate neighbourhood and the art-gallery. How nice it would have been if the statue was floodlit or made to shine in the light thrown on it from hidden lights fixed on to the pedestal itself. But then, why illuminate the image when his ideals have been forsaken!*

TUBERCULOSIS SECTION

The first stall on *Ashoka Street*—the model road on which health stalls abut—deals with tuberculosis. It appears to be a joint effort of the Corporation of Madras and the Government Tuberculosis Organization. The space within which the show had to be organized is very small. A model sanatorium expected to cover an area of about 500 acres is exhibited. The layout is glaringly extravagant; few sanatoria of this kind can be developed in our country. The posters put up could have been more explanatory, interesting and edifying. A few pathological models are crowded on a table with no captions to edify the visitor. The exhibits do not teach the public how Consumption spreads. It does not tell them what precautions they should adopt and what basic remedies a corporate body should carry out. There is nothing to indicate or describe the plan chalked out for the city by the expert committee. One wonders if these are deliberate omissions!

MALARIA

Next comes the Malaria section. This again is a joint effort. The exhibits are cramped. The models should have been arranged to represent some one theme, instead of ill-coordinated facts. Some more vernacular posters and placards could have been put up to avoid oral explanations. In these exhibitions it is always better to have self-explanatory exhibits, complete with understandable placards. The rural malaria model is far too small to be instructive,

The reason for such a poor show is obviously lack of sufficient space. The organisers could have achieved better effect by restricting the exhibits and by placarding them more instructively and attractively.

CORPORATION STALLS

The Madras Corporation has put up a show exhibiting the present source of water-supply from Satyamurthi Sagar down to Red Hills. How nice it would have been if the Corporation had displayed a *working model* of the proposed *Krishna-Pennar* Scheme. The P.W.D. (Irrigation) have put a model in their show. This is more intended to show the benefits which will accrue to agriculture. A good opportunity to educate the public and get their support on this important and useful subject has been allowed to slip by.

It is most unfortunate that the Corporation should have spent money on installing a model of a rapid filtration plant, and, what is more, explaining it as 'proposed by Madras Corporation for a better and purer water-supply'. The proposal to instal the socalled *mechanical filters* has now receded to the background pending the installation of a pilot plant utilising *micro-strainers* and the observation of the results. The Corporation seems to be more bent upon canvassing public opinion in favour of a method of filtration which does not yet find acceptance at Government levels. The explanatory placard adds insult to injury. Dubbing the *mechanical filter* as the Corporation's proposal for a purer water supply seems to insinuate that the Government by turning their proposal down, are not keen to give the people good water! Such exhibits would have been more appropriate to commercial houses interested in sale of such plants.

The Corporation has also exhibited models of public conveniences which are located throughout the city. The person in charge of this particular model was requested to explain the functions of a septic tank by an officer of the Public Health (Medical) Department, who had done enormous amount of work in this particular field. The elucidation given by the attendant was so depressing and so unscientific that this official was dazed. It would have been to the credit of the Corporation, had they posted men who knew something about the subject, to explain the models to the people! As I have stated already, well written captions and placards in vernacular will be more useful than any number of attendants. Oral explanation should be cut down to a minimum.

Another model is shown—the proposed sewage disposal in a particular area of the city. The sewage is passed through sedimentation tanks and passed through filters fitted with revolving sprinklers and finally disposed off on land. If the ultimate disposal of sewage is on land, all these preliminary treatments of an expensive nature are uncalled for. The lay public may not understand all these, and are likely to go away with wrong notions.

MATERNITY AND CHILD WELFARE STALL

Here, the exhibits of a primitive type are displayed. A number of clay dolls and miniature models make the stall appear more like a toy shop than an educative exhibition. In this connection, I may recall how a child welfare centre was conducted in the Trichinopoly Exhibition some years ago: A pre-natal clinic was situated on the outer boundary of the exhibition grounds with separate entrance from outside. Those entering the exhibition could see for themselves how such a centre is run. A similar procedure could have been adopted in this exhibition. If this is impossible, at least *actuals* could have been arranged in a neat and edifying manner instead of just leaving some dolls in charge of a few dumb ayahs!

CITY IMPROVEMENT TRUST

The City Improvement Trust has an attractive stall. The space allotted is extremely inadequate. At least four or five times the area now taken up is required to stage the exhibits in this section. Even within the space available, the models could have been slightly improved. The plans could have been bigger or at least portions of plans could have been enlarged to give the public a correct idea. A model of an ideal village is put up. This exhibit shows how our experts are trying to urbanise our rural areas! For instance, wide roads have been shown in the layout, as if two or more motorcars have to move abreast in our village roads! Fortunately, such remodelling of our villages will remain only in the imagination of our town planning experts. Even in industrialised countries like England, Reilly's ideas of planning are gaining ground. In his plan for Birkenhead, he has shown how economy of space could be effected and how communal life, as it should be, could be encouraged. By adopting the principles of our ancient village planning, he has shown that emulation is the worthiest form of adoration.

BCG—VACCINATION

This set-up is, on the face of it, intended to boost up the BCG-vaccination, despite what has been published on the subject! One rather feels it to be unwise on the part of the authorities to have permitted this. It so happened that while I was talking near the stall with a group of friends, among whom there was also an acknowledged authority on tuberculosis, we heard some people shouting at the sight of the BCG signboard "Don't go near that stall; they will compulsorily put poison into us."

The provision made for screening the chests of people is equally unwise. A man who considers himself ordinarily healthy would get a rude shock, the moment he is told that there is a small patch somewhere in his lung; after all it might only be a 'patch' in the screener's mind. The shock would be enough to accelerate the poor man's end! Much has been written on the psychological acceleration of the disease-effect on man.

It is said that tuberculin testing is intended to be carried out at this stall. The results of the tests cannot be judged till after three days. Are the people expected to come back to the exhibition? I understood that the people have been asked to visit any of those *dispensaries* to show the reaction of the tuberculin test. The organisers are hopeful of following these cases later on. What organisation is available for effective follow-up is not made clear. The object of this stall is 'fact-finding'. It is extremely doubtful whether reliable data can be gathered at all in this manner. One is inclined to ask in this context what happened to the statistics collected among our college boys and girls. Cannot some useful inference be drawn therefrom and the public taken into confidence and given the benefit of such findings before further push is given to the campaign?

Figures showing the number of people tuberculin tested and the number of people X-rayed are being written from time to time on a blackboard. I shall not question the authenticity of these figures which are intended as a fillip to untested and un-X-rayed visitors to enter the stall. It would be nice if the number of tuberculin positive and tuberculin negative reactors is shown. The number of negative reactors who were willing to be vaccinated with BCG, should also be put up. This would give a correct idea of the picture. It is also unfortunate that the BCG-stall is not located in juxtaposition with the general one on tuberculosis. If the other stall had exhibited the influence of environment on tuberculosis, then people could have easily judged for themselves whether the remedy for the evil is BCG or an improvement in living conditions. The energies of some of our ablest

officers in the department are being frittered away on popularising BCG! The Tamil Nad Congress Committee is evidently unaware of what propaganda is going on in its stalls!

As a method of gathering statistics, this stall is excellent; but if it hopes to popularise BCG, it is doing no service to the people.

LEPROSY STALL

Full credit is due to Mr. T. N. Jagadisan who is doing yeoman service in the cause of leprosy. Under his able guidance, the leprosy stall proves to be most instructive. If only he had all the facilities which a Government department could afford, his stall would have been more attractive. But as it is, this private stall compares favourably with those of other Government departments. Mr. Jagadisan's pamphlets on leprosy on sale at nominal price in this stall would supply all information that the inquisitive visitor needs about the subject.

INDIAN MEDICINE STALL

The Department of Indian Medicine deserves to be congratulated on having offered to display a stall. Indigenous medicine has immense potentialities unknown to the public. Such exhibitions would go a great way to bring out many useful remedies which are as yet unknown to many. The Department has not made a very good attempt in displaying not only the theoretical basis of the system but also therapeutic value of its remedies. Something could have been put up to show the knowledge of our ancestors in surgery and midwifery as well. A balanced diet according to the *Panchabhautic* standards is recommended. It would be of interest to contrast such a diet with the one on show in the Nutrition Section of the Madras Public Health Department.

KING INSTITUTE STALL

The King Institute, Guindy, has a stall showing the technique of the preparation of vaccines and other biologicals. The stall would have served a better purpose had it emphasised on the purity and potency of the vaccines prepared in the King Institute. The actual usefulness of the vaccines is more the concern of the Public Health Department. What the King Institute is concerned with is the preparation of such vaccines. It would have been a nice idea to actually prepare some vaccines in the stalls for the public to see; they would have been convinced that the vaccines which come to them from Guindy are beyond reproach. If need be, these specimen vaccines can be discarded afterwards.

This stall includes exhibits on food adulteration. Instead of mere dummy shows, actual analysis of common foods done in the stalls would have been more impressive.

BLOOD BANK

There is a Blood Bank next to the King Institute booth. I would have preferred a mobile and collapsible unit which can be taken from place to place and which is also scrupulously hygienic. The space enclosed in the stall for the actual operation of donating blood cannot be effectively made dust-free. It is hard to imagine that the blood bankers are anxious to get many donors at the exhibition grounds, as the blood they receive is likely to be contaminated with germs and dust from the atmosphere.

NUTRITION

The Public Health Department has arranged a stall to educate the public on nutrition. A Presidency map with districts where 'nutrition surveys' have been made is put up, attractively lighted from the rear. The officer-in-charge of the stall is anxious to educate the visitors and he answers willingly the questions put to him. The exhibits include diets of people in food deficit and surplus areas, hostellers and a model diet for a family of four. An especially, scandalous revelation is that in a certain

hostel, where a survey was conducted, the average expense per head was four annas eleven pies. It is frightening to imagine that growing children of about ten years are being starved on a diet like that which requires at least a four-anna increase per head to make it balanced. From the exhibits, one is able to understand that four rupees a day is the minimum expense for a family of four people, if they are to consume balanced food. With an Indian's average income at thirty rupees per mensem, we can easily see how balanced is the diet his family is eating today! The main purpose which the nutrition exhibition serves is to let the public understand the stark reality of life. It is for the people to join now in the food production drive, which is the only way to combat malnutrition. The workers whose large families starve, would also have excellent reasons for demanding higher wages. I have referred elsewhere to the need for proper display and explanatory placarding in local language to make the exhibits self-educative without oral teaching. In this respect, this stall can be deemed the best.

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FLY CONTROL

An instructive and useful section is about fly-breeding. Posters illustrate the evils which would arise by allowing breeding places for flies. The people should be benefitted by visiting this stall. It would help them to know that breeding places for flies in their premises and in the neighbourhood should be rigorously eliminated. Fly-free *milieu* is a vital and essential step towards improving our living conditions.

SANITARY ENGINEERING STALL

One observation which strikes a visitor on entering the stall is that in an *engineering* stall, they should have fitted up a motor and pump in such a way as to shake the entire gallery and along with it the exhibits. It is said in Tamil Nad that lizard which foretells the future events of man is unable to predict its own future; but eventually falls into a cattle trough and drowns itself. So also the engineers, who tell others how a motor and pump should be fixed rigidly to take in the impact effectively, have fixed the motor in their own stall in a manner which shakes the exhibits.

A model of a gallery with the connected work is exhibited. A cross section of it is also found there, but fixed at such an angle that it does not readily catch the eye of the visitor. Visitors are not, of course, expected to find whether or not a cross section is exhibited! The section of the gallery itself does not represent a revised design which has been *adapted* from that evolved in Holland after long experiments. The model gives an erroneous idea to the visitor. The revised section is in vogue in the Province for over a decade and a half.

BLIND LEADING THE BLIND

A chloronome (a mechanism utilised for chlorinating public water supplies) in working condition is exhibited. An young man (a supervisor of the department) is placed in charge of the stall to explain to the visitors its working features. While attempting to explain the working of the mechanism in simple English, the young man fumbled. He pathetically pleaded that he was but a fresher from College. This reflects on the college in which he was trained as also the department in which he is employed.

A cross-section of a built well is on show. The section does not correctly represent the design approved by the Board of Public Health. Provision of weep-holes in such wells is an important feature. What has been exhibited gives a wrong impression. Further, the typical design provides facilities to avoid pots knocking against the steining of the well, as in practical experience public wells get partly filled up with broken pots. This section does not show *this* important detail.

An elaborately worked out model of Salem-Mettur water supply is displayed. A visitor wanted to know what was meant by a "booster" in the exhibit. When the youngster vainly tried to explain, another visitor said in a commonsense way: "Why call it a 'booster', why not call it simply a pumping station?" The selection of Salem-Mettur water supplies for exhibition is unfortunate. Despite vigorous attempts, Salem has not, uptodate, been supplied with water from Mettur. This is an instance where nearly forty lakhs of rupees had been sunk over a decade back without deriving any benefit therefrom. An instance of bungling need not have been put on the show. A good water-supply scheme that has actually fructified could have been chosen. Had a visitor put a question on this aspect of the scheme, the organizers of the stall may have to hang down their head in shame!

A double-tap fountain is shown. It should be appropriately called a toy, which even a child would be tempted to reject as a plaything. The exhibit looks more like a caricature of a public fountain than a miniature model. The taps fitted in it are just the type which the sanitary engineering department has been ceaselessly urging the local bodies to avoid. One of the visitors left the tap open. When asked what would happen if the tap was kept in that condition continuously, the young man replied readily that water would be flowing out. A question was put to him whether he knew the name of the tap fitted in the model. He did not know. When asked what kind of tap should be fixed to these public fountains, he put his finger on the nut which secures the plug to the tap and simply smiled!

It was Oscar Wilde, who said that people styled their mistakes as *experience*. If everyone attempts to gain experience by committing mistakes without getting benefitted by the experience of others, then by some miracle, one should wish to get young again on reaching a ripe old age to profit by one's own experience! Such miracles are obviously impossible. That is the reason why people say that experience does count. The elder men are expected to transfer their experience to youngsters; but the youngsters should be receptive. Our present day politicians do not seem to appreciate that experience does count. Young and inexperienced should not be permitted to gain experience at public cost. It would ultimately cost the State heavily, as it very nearly threatens to, in the case of Kayalpatnam water-supply scheme. The exhibition set up by this department seems to illustrate what inexperience would cost the State immediately and ultimately!

I do wish that some senior officer like the Chief Engineer in charge of sanitary engineering had directed the selection and making of models as also their display in the stall and above all the posting of suitable men to explain the models to the visitors! This is how a senior should transfer his experience to inexperienced youngsters. In selecting models for exhibition of this kind, special care should have been bestowed as to the main objective in view. If it is intended to educate people, as it should be, the models should refer to the subjects in which it is proposed to educate them. Models which may be of interest in Engineering Colleges are not apposite in the case of exhibition of this nature.

It is wise to remember a time-worn *Tamil* saying: "கன்றுகள் கூடி களம் அடித்தால், வைக்கோலும் ஆகாது; செத்தையும் ஆகாது". It means literally this: If calves are yoked to thrash out corn, neither straw nor rubbish would result.

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* I am glad to observe since I wrote the foregoing notes, some improvements have been made in the facade of the Exhibition ground. The statue of Mahatmaji has also been lighted.

—*A. V. R.*

POLIOMYELITIS
(INFANTILE PARALYSIS)

by

U. S. Public Health Service

EARLY SYMPTOMS

At the start, poliomyelitis is often hard to distinguish from a cold, influenza, or various diseases of childhood. It begins suddenly, usually with fever of over 100 degrees, headache, vomiting, and sometimes sore throat. Stiffness and pain in the neck or back may give warning of poliomyelitis.

These symptoms may last only a few hours or a few days, and the disease often goes away with no ill effects. Probably a great many cases are never recognized as polio. In more serious cases, the fever lasts from 3 to 10 days, and may come back; paralysis often begins with the second attack of fever.

WHAT ARE ITS EFFECTS?

The danger of poliomyelitis is in the effect the virus may have on certain parts of the brain and spinal cord. It attacks and sometimes destroys the motor nerve cells, which control the muscles. When these cells are destroyed, the muscles cannot receive impulses from the brain, and so are paralyzed.

If all of the motor cells controlling a particular muscle are destroyed, the paralysis is complete and permanent. However, less completely damaged cells often recover, and recovered cells may gradually learn to take over the job of the permanently injured cells. This explains why cases of paralysis may recover partially or completely over a period of about two years after the disease.

The muscles themselves are not directly damaged by poliomyelitis, but a muscle which cannot be used will gradually weaken and atrophy. Such treatment as massage, hot packs, and electrical stimulation are used to keep up the strength of the paralyzed muscles, so that they will be ready for use if and when the nerves begin to recover.

TYPES OF POLIOMYELITIS

The most common and least dangerous type of poliomyelitis is the so-called "abortive" attack, which is simply a brief infection without serious effects. Such cases may not be recognized as poliomyelitis. If the patient continues his normal activities during a mild attack, he may develop a more serious form of the disease. He may also spread the infection to others.

If the poliomyelitis virus seriously injures the brain or spinal cord, the symptoms become much more serious. Some form of paralysis often results.

The most common type of paralytic poliomyelitis affects muscles of the arms, legs and trunk. This is the crippling type. It is not ordinarily dangerous to life unless the muscles of breathing are paralyzed. If this happens, the patient may have to be placed in a respirator, or "iron lung."

Less common, but most dangerous of all, is the bulbar type of poliomyelitis affecting the nerve centers at the base of the brain. These include the master centers which control breathing, swallowing and coughing. Most of the deaths from poliomyelitis are due to paralysis of these centers.

DANGER AND OCCURRENCE

It is difficult to get accurate statistics on poliomyelitis, since many patients may not call a

doctor or report to health departments. Serious cases, however, are more likely to be reported, and this makes the percentage of deaths and paralysis appear greater than it is. The best figures are based on direct surveys of the population, rather than official reports; but even these are inadequate.

According to these survey figures, almost half of all recognised poliomyelitis cases recover completely, although three out of four develop at least some temporary paralysis. About one in five is seriously crippled, and one in 20 dies of the disease. Poliomyelitis epidemics are unpredictable but, in general, the most vulnerable areas are those of the temperate zones which have not had a major epidemic within five years. Epidemics do not sweep the country. An "epidemic year" is simply one in which there are a large number of local outbreaks of the disease.

Children about three years of age seem to be most susceptible to the disease but it may attack persons of any age. Some doctors believe that many persons, without even knowing it, have had a mild case which renders them immune. It occurs most frequently in termperate zones in the late summer.

WHAT CAUSES POLIOMYELITIS

Poliomyelitis is caused by a filterable virus—so called because the virus is small enough to pass through the finest filters. It has been photographed by means of the electron microscope and is estimated to be about one half of one millionth of an inch in diameter. Despite this small size, it can be identified and studied in various ways, so that scientists have been able to learn a good deal about it.

HOW IS IT SPREAD?

No one is certain how the virus is transmitted from one person to another. There is consedirable evidence which suggests that it may be spread by direct contact with either recognized or unrecognized contact cases.

The virus has been found in the nose and throat and in the intestinal entrails of contact cases. It also has been found in sewage and in or on flies. Polluted drinking water, polluted swimming places, and contamination of food by flies have all been blamed, but final proof is lacking. Polio may be spread in all of these ways, or possibly in some other way not yet suspected.

Most authorities believe that the virus enters the body through the nose or mouth. It may be that in some instances it enters the central nervous system by way of the olfactory nerve of smell in the nose, but it is no longer believed that this is the only route. The virus is also found in the lower intestinal tract, where it usually remains for three weeks or more after an attack. Some healthy persons—mostly children—carry the virus and may play a part in spreading the disease. A large proportion of cases have been found to follow the removal of tonsils by a few days or weeks. Cases following tonsil operations are apt to be of the dangerous bulbar type.

POLIO RESEARCH

The U. S. Public Health Service, the National Found foration Infantile Paralysis, and numerous local centers are constantly searching for methods of control and for cures.

Virus research was formerly handicapped by the fact that the disease could be transferred only to monkeys. The expense of these animals made extensive research impossible. In 1939, the U. S. Public Health Service successfully transmitted certain strains to the cotton rat and the mouse. This gave impetus to virus research and increased our chances of finding an immunizing agent or curative drug.

Most progress to date has been made in developing methods of minimizing the after-effects of the disease. Now, when the motor

(Continued on page 111)

UNUSUAL WATER SUPPLIES

by

A Research Worker

The author has laboured hard to cull out information from varied and various sources, which have been listed at the end of the article. A perusal of this article would help to stimulate the thought of our water engineers and to help to solve what would appear at first sight to be *impossible problems* of water supply. The lay reader would be interested to know how water-supply problems have been solved elsewhere by adopting unusual or rather unimaginable methods of development of sources.

—Ed., P.H.

It is a truism that we rarely appreciate the good things of life unless we have occasion to do without them. Very few of us who have been brought up in modern cities realise what it is to go without water. An American soldier very forcibly brings this fact before his compatriots in the following words . . . "Those who have tramped through the bush . . . . known only too well that nothing but water will quench thirst. Champagne is all very well for weddings and the tinkle of a properly made julep sounds delightful on a hot day but what goes down so easily as good water anywhere in the world "?(1).

The struggle put up by man for this essential commodity in those parts of the world where Nature is not bountiful makes a very fascinating and instructive study. In several areas, the difficulty is the absence of any water at all. In other areas the water that is available is too brackish to be tolerated.

WATER DIVINING

In the story-books we have read of a very simple method of " Water-divining ". A ship-wrecked sailor in quest of water starves his dog for several days to sharpen its instinct and makes it lead him to a source of water. How we wish that such a method could be adopted in actual life ! We also hear of "water-diviners"—persons endowed with a sixth sense—who can make a forked twig reveal the secrets buried in the bowels of the earth. Unfortunately these persons also appear to be quite fallible. The only sure method of " water-divining " is the straight and hard method of studying the distribution of water in a particular locality and attempting to forecast the location of the water bearing strata with the aid of geological methods. Science has somewhat lightened this heavy task by introducing the methods of geophysical exploration which map out underground strata and reveal discontinuities. This has proved of considerable value to the Allied army during the recent War.(2) (3).

PLANTS AS SOURCES OF WATER SUPPLY

We have also read stories in which various desert plants have come to the succour of the

weary traveller. In the arid regions of Africa and Australia such plants are said[3] to be well known and exploited. Water-melons and pumpkins form important sources of water in South West Africa and in the Northern part of the Kalahari desert. Natives depend on these sources for two or three months in the year. Several creepers contain long straight hollow stems which are filled with water drawn from the ground. These are cut and the water is sucked out. Roots of the "needle bush" and the stem of the " paper-bark tree " are used by the aborgines of Australia. Roots of several plants are used in Chile.

Trees are said to be used as reservoirs of rain water. In the Sudan, a big tree (Baobab) which sometimes reaches 40 feet in circumference is used as a rain water tank. The trees are naturally hollow but have been further hollowed out by the natives. Rain water runs down the branches into the hollow or is sometimes filled in by the pool formed below during the rainy season. Each tree can store about 250 gallons of water while some can store much more. In Sudan, there are over 33,000 such trees which are numbered and registered.

When water retaining plants are used as fodder, the cattle can remain without drinking water for a considerable time. Some of the plants used for this purpose are the thornless cactus of Mexico, and the Tamarisk of North Africa.

RAIN WATER STORAGE

In many areas rain water has to be stored and depended upon as main source. The soil is often too porous to retain the water and the rate of evaporation is very high. Rain is collected on roof tops or on specially prepared catchment areas of concrete which are kept clean, white-washed and protected by fences. Outcrops of bare rocks are sometimes prepared as catchment surfaces by stripping off the loose soil and vegetation and filling in the cracks with cement concrete. In South Australia and Africa natural or artificial hollows in rocks are used to store water. These are called " *rock-pools* " or "*Gnama holes*" or " *Ungurungu* " (in Africa). Evaporation losses are minimised by roofing them with some local materials.

DEW AS SOURCE OF WATER SUPPLY !

Collection of Dew[4] by suspending inclined sheets of corrugated iron mounted on poor conductors of heat (such as poles) and the collection of the water into troughs has been adopted in some areas. In one instance sand-dunes were excavated to provide a sloping surface on which large sheets of water-proof paper were mounted to collect the dew. Large shallow concave pans (20–40 dia.) known as " Dew-ponds " are constructed on hills and ridge crests. The floor of these dew ponds is puddled with clay. Modern dew ponds are made of concrete, and designed to collect the maximum amount of water while exposing the minimum surface for evaporation.

ATMOSPHERIC MOISTURE

Attempts have also been made to condense atmospheric moisture. Dixey[4] quotes the description of a stone tower through which air is drawn towards the centre of the tower and comes in contact with loosely filled stones which help to condense the moisture. A German Patent[4] (A) suggests the use of silica gel for the absorption of moisture in a device intended for the production of drinking water supplies for aeroplanes.

In several areas, blocks of ice or snow are stored in under-ground chambers and are melted as required.

At a place in Kenya, it is reported that steam issuing out of a vent is condensed and used for watering cattle[4] During the second World War the Japanese troops in Iwo Jima obtained[5]

their drinking water supply by condensing the steam issuing from the ground.

SEA SPRINGS

At Hardy Island, North Australia, it is reported[6] that a fresh water spring bubbles constantly beneath the ocean near the shore. The natives obtained supplies from the spring by means of bamboo poles fixed at the prow of a canoe and thrust down the outlet. As the water bubbled up the prow, it was run off into large shells. The Australian troops obtain clear water by lowering a weighted hose into the spring and pumping the fresh water to the overhead tanks. The author understands that at Villurini, near Rameswaram, fresh water springs occur close to the sea. These springs are covered by the sea for part of the year but when the sea recedes, the water bubbling in could be seen.

DESERT WATER TANKS

In the semi-arid desert regions of South West Arizona where the rainfall is not greater than 5-12″ per annum and where most of the rainfall occurs in three months, the extreme heat and dryness of the climate make it impossible to conserve water in any type of open pond or reservoir. Such conditions are met by the construction of what are known as "Desert Water Tanks". A sub-surface dam is thrown across a stream bed or a large desert sand waste at a suitable place. During the summer-rains, these streams carry large quantities of sand which deposit on the impounding basin behind this dam. The voids in this material impound the water which is tapped through specially designed wells put up on the upstream face of the dam. This device minimises evaporation losses and ensures absence of contamination by animals. Many such wells exist in Mexico and Arizona.[7] Guembel describes some structures which date from 1875.[8] During the wet weather water can actually be pumped on to such desert water tanks to augment the storage.

GALLERIES AT FOOT HILLS

The water from the melting snow and the occasional storms are absorbed in the stony floor of the foot-hills of the Himalayas and are tapped in Baluchistan by an ingenious system of galleries.[9] These galleries start with a shaft at the source and proceed underground with a very slight slope and eventually reach the surface of the ground at the place where water is sought. Ventilation shafts are provided at frequent intervals. These galleries are known as *Kharez* in Baluchistan and as *Kanayets* in Persia and Syria and appear to have existed from very ancient days. Similar galleries running sometimes six miles long are said to exist in Algeria where they are known as *Feggaguir*..[4] Paver[10] mentions a gallery which is said to be 57 miles long and another which is 1,000 feet below ground level. The remains of a Khares which appears to have been in use near Aurangabad (Hyderabad Deccan) has been reported.[11]

Mr. C. Skelton[12] who was some time Chief Engineer of the Jodhpur State feels that there is plenty of water under the Rajputana desert and that the source of this water is the Himalayas. He wrote "I am convinced that . . . . . if it is scientifically tapped, a very copious supply would be available for people over a vast area which is badly in need of water. Even apart from irrigating this desert this idea of tapping the water that occurs near the foot of hill ranges appeares worth being investigated in our country and could probably lead to small supplies." At the moment, the Government of India are contemplating to explore the possibilities of ground water sources in Rajastan area".

WATER SUPPLY TO SHIPS

Coming now to the areas where there is "Water, water, everywhere but not a drop to drink"

let us examine what man has done to meet the situation. Naturally, the problem first arose in ships sailing the high seas. The earliest successful attempt to obtain the drinking water requirements of the ship's company by distillation of sea water was made by Sir Richard Hawkins who was one of the officers who took part in the battles against the Spanish Armada([13]). It is curious that though a number of attempts were made at various times by illustrious scientists the idea of equipping the ships with distilled water plants did not get established till the beginning of this century. Even today several ships carry fresh water though it is known that it is more economical to carry fuel since one ton of fuel can yield nearly 10 tons of fresh water.

In the early days of West Australia, large cylinders of bright tin were supported from roof tops and fitted with a sliding connection to receive the stem of an ordinary kettle. These stills could supply about three gallons per day([4]). Till recently, Aden used to distil sea water for drinking purposes and it was sold at Rs. 1-8-0, per 100 gallons([14]). During the recent World War the United States army widely adopted methods of distillation of sea water to obtain drinking water supplies in isolated atolls and sea bases. Thus, distillation was employed at Iwo Jima and in several places in the South Pacific([15]).

During the recent War considerable attention has been paid to the design of stills for the distillation of sea water. The aim has been—on the one hand—to improve the stills used on the land to make them more efficient and portable and on the other hand, to devise stills which could be conveniently packed into lifeboats. In the first direction, the most notable advance is the employment of the principle of compressing the steam before allowing it to condense. The U.S. Army have designed a still which can produce more than 110lbs. of stream per lb. of fuel([16]). In the second direction, the British Ministry of Transport have developed stills capable of using solidified fuel or compressed coal briquettes. "Herrons Safety Still" uses a non-liquifying gasoline compound as fuel and trails the condenser in the sea-water. Ingenious contraptions which aim to vaporise the sea water by the solar heat and condense the vapours in a chamber cooled by immersion in sea-water have been reported.

UTILISATION OF SOLAR ENERGY

The employment of Solar energy for distillation of sea-water is an attractive idea and has been investigated by several workers. In one device the sea-water is allowed to trickle down a series of trays mounted one below the other in a compartment inclined at 45° and provided with a glass side and a heat insulating back. The vapour passes into the condensing chamber which is screened by the evaporating part of the apparatus and the condensed water collects in a chamber at the ground level. Several patents([18] to [21]) have also been taken in the United States. One of these is for a light collapsible still which can go into a life boat and yield one quart of water per day. The Russians are reported to be using Solar distillation of salt water ([21], [22]). The news papers reported([23]) in 1945 that one Dean Saidman, the Director of the Institute of Actinology of Paris, had proceeded to India on the invitation of the Jam Saheb of Nawnagar to examine the possibility of employing Solar distillation of sea-water for supplying the Rajputana States with fresh water for irrigation purposes. This scientist is reported to have expressed the opinion that it would be feasible and economical to pump sea-water to the deserts of Rajputana, treat it by Solar distillation and obtain quantities of fresh water adequate for irrigation. I understand that some experiments were in progress in the years 1947-48 but further information is not available.

COLD DISTILLATION OF SEA-WATER

Freezing as a method of obtaining fresh water from sea water has been contemplated and several patents have been taken out for the design of suitable apparatus.[24-26]

Considerable ingenuity has been expended in the search for other and simpler methods of obtaining fresh water from sea-water to serve particularly the needs of the shipwrecked sailors and airmen. The discovery in 1935 by Adams and Holmes of materials which could be used to exchange hydrogen and hydroxyl ions opened out a new vista as it was possible—for the first time—to reduce the salt content of a water without distillation. Considerable work has been done on these materials all over the world and also in our country. While these resins would certainly yield fresh water the cost of treating sea-water would probably be prohibitive.

It is reported that in U.S.S.R. they are converting sea-water into fresh water adopting a method so cheap as to supply water for irrigation purposes over large tracts.

ION-EXCHANGE RESINS

From the point of the view of the needs of the shipwrecked sailors, a consideration of greatest importance is the space. The most suitable method would be that which the ratio of the fresh water obtained by treatment to the volume of the equipment would be maximum. Judged by this criterion the ion-exchange resins proved unacceptable. A large number of precipitants such as uranyl acetate, phyenyl mercury gluconate and lead fluoride have been suggested.[27-29] The method finally adopted[30] by the army consists of using desalting briquettes containing moist silver oxide, silver zeolite, barium zeolite and a little bentonite. The shipwrecked sailor fills a bag of reinforced rubber with sea-water, drops one of these briquettes into it, kneads it thoroughly and sucks off the water through a filter disc screwed into the mouth. The chlorides are absorbed by the silver zeolite while the sulphates are absorbed by barium zeolite. The salts of calcium and magnesium are precipitated as the hydroxides. Bentonite is added to the briquettes to help them to swell and break easily on soaking in water. These briquettes which are compressed to a volume of 50 cc. can yield 397 cc. of fresh water.

FRESH WATER NEAR THE SEA COAST

It is a never failing source of surprise to the layman that sweet water is available next to the sea. As a matter of fact this phenomenon is so universal that it should evoke little or no surprise. In the Madras Presidency we can point to the occurrence of excellent fresh water in limited quantities at Rameswaram, Tiruchendur, Adayar and other coastal areas. The Allied army found during the first World War that the best waters in Egypt and Palestine occurred nearest the sea. In Dhanushkodi we obtain fresh water provided we do not dig deep. In Jaffna (Ceylon) fresh water is obtainable close to the sea. The subject of tapping such sources appears to have been studied in great detail in Holland.

It is now believed that fresh water is generally always available near the coast. The fresh water is believed to occur as a floating lens-like layer on the sea-water. It is possible to tap this water provided we keep a check on the draw off so that the water level is not lowered to such a level that the salt water intrudes into the well.

SKIMMING FRESH WATER !

In the Hawaii Islands, the fresh water floating on the top of salt water is skimmed off by a construction known as "*Maui wells*". These wells penetrate to near sea level and then proceed in a horizontal direction and have been in use since 1902. During the recent War, the allied army employed similar measures to skim off the fresh water in Guam Island[35] and in Pantellaria.[36]

An emergency skimming trench in which empty bomb-crates were used as infiltration tubes was installed in Coral island and helped to solve its water supply problem.[37] Similar methods[38] have been adopted to abstract water from the Chalk in the South Downs and to prevent the tapping of salt water. During the Middle East Campaigns of the second World War, a series of infiltration galleries were constructed at more than 22 sites along the Mediterranean coast of Egypt and Cyrenaica to provide drinking water for the army.[39] These galleries were carried down one to two feet below the water table and were provided with baffle weirs set four inches below the level of the water. These weirs enhanced skimming effect and prevented the pumps from drawing salt water.

This source of fresh water occurring in coastal areas does not appear to have been adequately exploited in our country. Investigation of the possibility of tapping such sources may not only help us to provide the much needed fresh water to coastal villages but may also help to ease the position in a metropolis like Madras especially when—as happened recently—the City was threatened with a water famine.

A STAGGERING SCHEME OF WATER SUPPLY

This account of unusual water supplies would not be complete if mention is not made of a few undertakings which stagger us on account of their magnitude. Laughlin[40] describes what is called "Playfords' pipe-dream". Water has been conveyed a distance of 223 miles from the Murray River in Australia through a 30" concrete lined steel mains. The water is lifted 1,658 feet above sea level over a distance of 61 miles and thereafter flows by gravity. 27 reinforced concrete tanks are provided along the route. The total cost of this undertaking was £. 3,122,000.

DANGERS OF DEFORESTATION

Deforestation of the water-sheds feeding a river increased abstraction of water from the river as well as progressive depletion of ground water increase the chances of encroachment of salt water further inland with the result that fresh water sources deteriorate. Such a state of affairs led to the construction[41] (across the mouths of the same Murray River) of five barrages totalling 2½ miles in length and costing Rs. 80,31,248. As a result, the water in the shallow lakes at the mouth of the river has again become sweet and the people in towns along the lower course of the river are now assured of an unlimited supply of fresh water. A similar trouble led to the construction[42] of a sub-surface dam across the mouth of the Santa Ynez river at California. This dam was constructed one mile upstream and was 3,000 feet long and is reported to have cost "only" 300,000 dollars.

It is just possible that in some areas of our country where the underground resources of fresh water are limited, and consequently wells which start yielding fresh water soon turn brackish (*e.g.*, Saidapet, Madras Presidency), similar construction of sub-surface dams across the mouths of the neighbouring rivers may help in improving the underground storage of fresh water.

(Continued on next page).

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(Continued from page 104)

POLIOMYELITIS

nerve is killed and a muscle paralyzed, a surgeon can, in some instances, transplant the tendon of a healthy muscle and cause it to do some of the work of the damaged one. Weakened joints can be treated, unequal leg lengths corrected, and muscles retrained.

WHAT TO DO DURING AN EPIDEMIC

Since there is no sure protection against infantile paralysis, all that can be done when an epidemic comes is to observe simple precautions :

1. Do not get over-tired.
2. Avoid sudden chilling—don't plunge into very cold water on a hot-day.
3. Pay careful attention to personal cleanliness.
4. Do not undergo a tonsil, adenoid, or any other operation of the nose or throat that can safely be postponed.
5. Be sure the milk and water you drink is pure.
6. Keep food away from flies.
7. Do not swim in polluted water.
8. Avoid unnecessary contact with other people.
9. Stay away from persons who have any symptoms of the disease.
10. Call a doctor at the first development of a fever, symptoms of a cold, or digestive upset.

THE PUBLIC HEALTH ENGINEER

by

J. N. Murthy, *M. Sc.*

Sanitary Engineers with basic training in civil engineering early developed the talent in water supply, sewage and waste disposal. With a view to meet the problems of design and operation of such sanitary work a knowledge of the chemistry and bacteriology of those services became essential. To satisfy this end the activities of the Public Health Department may be classified into two distinct but associated fields, one having to do with the human element and the other with the environment. The former is in the domain of the physician and the nurse while the latter is that of the engineer and chemist. A successful operation of a public health programme demands administrative participation and careful planning by both the physician and the engineer. A complete health programme must include sufficient provision for both the human element and the environment. The health officer aided by adequate and competent engineering assistance can assure the needed assistance and technical advice necessary to provide a complete programme.

The Public Health Engineer has two-fold duties. 1. Sanitary Engineering and 2. Sanitary Inspection. Sanitary engineering corresponds to primarily to the design of water works plants, construction of sewage disposal plants, and the operation of garbage incinerators. Sanitary inspection on the other hand was an activity that was planned to modify environmental factors in order to reduce health hazards. Past as well as present, this has been quite unscientific. For these activities consist in the routine law enforcement in the abatement of nuisances, many of little importance in relation to Public Health. These may well be in charge of other Government Departments, *viz.*, Police or Fire or P.W.D. The field of Public Health Engineering is quite comprehensive in that it includes the essential public health aspects of both sanitary engineering and sanitary inspection. It is based upon the fact that adjustment of the environment to human health involves the application of engineering principles. Thus it is seen that the basis of this professional activity is engineering and its major aim is the promotion of health.

The Public Health Engineer has clearly pictured the concepts of the chief objectives of public health engineering as under :—

1. An effective educational programme concerning the environmental sanitation.

2. A comprehensive study and plan of investigation in relationship of environmental factors to human health.

3. Unification of Federal State and Local planning in relation to all problems relating to environmental sanitation.

4. Improvement of engineering techniques and administrative procedure to meet the needs of the community.

It is quite possible for good deal of confusion in relation to the administration of public health matters relating to environmental control because of failure to understand the expanding role of engineering in the field of public health. The Health Officer may fail to understand, appreciate and utilise the newer concepts. Besides the engineering procedures involved in supervision, development and operation of various works, the public health engineer has so many other physical elements to deal, such as cheap houses and structures, equipment used to produce process and distribute the food supply, environmental conditions which support disease bearing insects and rodent life and growth of noxious weeds, industrial equipment with special reference to the effects on the air breathed, etc.

Based on the concepts and functions of the public health engineer researches suited to the environmental conditions of the State, on a variety of problems, such as; (1) the survey of the industrial wastes in the State, types of wastes, how they are at present disposed off and if they present any serious problems; (2) survey of the environmental conditions in the mines, factories, etc., relating to temperature, humidity, lighting and ventilation; (3) examination of the potable water in the rural areas and the removal of any harmful substances such as fluorides etc., have to be carried out in Engineering Research Institutions.

It is observed thus the part played by a Public Health Engineer is quite essential one in maintaining the standards of health. Conservative estimates from U.S.A., authorities show that a population unit of 50,000 or more requires the services of one Public Health Engineer plus an adequate number of assistants.

THE PUBLIC HEALTH ENGINEER

Our proposals for post-war health development require a large number of qualified public health engineers for the tackling of the problems of environmental hygiene. Public health engineering applies knowledge concerning the practical control and modification of the human environment to the prevention of disease and the promotion and maintenance of health. The major activities of a public health engineer include the following :—

1. Quantitative and qualitative control of water supplies.
2. Removal of solid and liquid community wastes.
3. Control of milk and food right from production through transport to distribution.
4. Control of air pollution.
5. Control of thermal environment in housing, industry, etc.
6. Control of pollution of streams, rivers, harbours, waterways, etc.
7. Control of animal, insect and bacterial agents of communicable diseases.
8. Safety and control of special occupational hazards in industry.
9. Control of light, noise, etc.
10. Promotion of amenities, such as parks, play-grounds, bathing places, etc., slum clearance, town planning, general cleanliness and control of offensive trades.

Other activities are continually being added to this list and it is evident that such specialised work calls for engineers with a definite public health outlook and a broad general education. A reference to the survey section of our report will show how backward is the control of sanitation in this country. In order to make a definite improvement in existing conditions it is estimated that about 2,000 adequately trained engineers will be required, with a yearly allowance of 80—100 for replacements.

(*Recommendations of the Health Survey and Development Committee*—Vol. II. Ch. XVIII).

VITAL STATISTICS

by

T. V. Ramamurti, *B.A., B.L., F.I.A.,*

Consulting Actuary.

> Figures relating to vital events of men cannot be satisfactorily gathered with any pretence to accuracy, without the willing cooperation of the people themselves. The statistics of our country are deplorably defective in content and quality. The author has brought out the point very well in his talk, in a manner which should grip attention. We would appeal to the people to cooperate with the authorities who gather statistics on vital events of life, in particular. We reproduce the talk by the courtesy of the Madras Centre of A.I.R.
>
> *—Ed., P.H.*

In the period between the two world wars to end all wars, Professor Hogben of the London University wrote a book entitled "Mathematics for the Million". Strange to say, the millions did buy it though it was about mathematics. In fact, it turned out a best-seller. In this book Professor Hogben has a chapter on 'Statistics' which he called the 'Arithmetic of Human Welfare'. The author, good man that he is, believed or at least hoped, that the statistical method would not be used for destructive ends. In this he was mistaken. For the method applied to atomic physics yielded the Atom Bomb. And—such is the strange working of the human mind—statistics no doubt greatly gained in prestige.

Nevertheless Professor Hogben was right in believing and hoping that statistics will have its most important applications in its use for promoting human welfare. This evening I propose to speak of one such field, the field of vital statistics.

Vital Statistics is a branch of social statistics. In a sense, it is the most "Vital" part of social statistics. It deals with features inherent in human social groups. Its subject is not things

but persons. It is concerned not with single individuals but with a collection of them.

You may well ask what sort of information vital statistics can give which has a bearing on human welfare. In answer, permit me to give you some of the more important aspects of such information.

We shall begin with the question of population, that is, the number of persons living in a country at any given time. Almost every day you will hear statements like 'India is over populated' or 'We cannot produce sufficient food inside the country for the whole population.' We need not at the moment go into the question whether these opinions are right or wrong. But you can see that the welfare of a country may be influenced by the number of its people.

The sex distribution of the population is another important factor. Some of the consequences of a lack of balance in the numbers of the sexes are obvious. For instance, the opportunity of marriage is evidently reduced to some members of one or the other sex. Other consequences are less obvious but not the less important. It may indirectly affect social customs, moral habits and in the long term the number and quality of the population.

Then we have age distribution which is intimately connected with birth rates and death rates. In some countries in the West to-day gradually decreasing birth rates and decreasing death rates at all ages, have radically altered the age composition of the population. If no factors intervene to check this fall in the birth rates, these countries may find themselves at no distant future date consisting of a population in which the number of people who are either retired or above efficient working ages so great as to lower the economic welfare of the country. On the other hand, the prevalence of a high birth rate and high death rate, especially at the younger ages, as in our country, means that children die before they become economically and socially useful with resulting misery and loss of valuable manpower.

Closely connected with the birth rates and the death rates we have the marriage rate; changes in ages at marriage, rates of loss of one of the spouses, husband or wife. Changes in marriage rates and in the ages of marriage often indicate not merely changes in social customs but changes in the economic structure of the population. The rates of widowhood implying generally the loss of the earning member of the family have necessarily an effect on the welfare of the family. The loss of a wife and mother is likely to be equally disastrous to the members of the family.

Another item of information that we may seek in our vital statistics is the occupational distribution of the population. Numbers and proportion engaged in urban or rural occupations, agricultural and mechanical industries, in the various professions involving personal service, such as lawyer and doctor, cook and domestic servant, these have a bearing on social welfare. Economists and Politicians arguing at weary length on the unbalanced economy of our country or pleading either for rapid industrialisation or firka self-sufficiency must necessarily take careful note of these figures.

No consideration of vital statistics can be complete without information about the health of the people. For this purpose we have many relevant factors to take into account. We have what are technically known as 'Morbidity rates," or rates of attack of the various diseases, the incidence of occupational risks or disease, the regional distribution and death rates among those attacked by various kinds of diseases. The Modern Sciences of Social Medicines and Environmental Hygiene owe much of their rapid rise to importance to information derived from such studies. Further, from the point of view of the modern State, such statistics throw a lot of light not only on the relative effects of the various diseases, but also upon the best

collective methods of combating their evil consequences. It will also provide answers to such questions as, whether the State should lay present emphasis on prevention or cure, on the provision of sanitary environment, protected water supply and production of nutritious food, or on hospitals and sanatoria, medical services and potent drugs. These questions in our country at any rate seem to be still in the field of controversy and it is not my purpose in this talk to deliver judgment. My only object is to draw your attention to the need of reliable statistics for arriving at a proper judgment on such essential questions.

This brings us to the problem of reliability of all such statistics. I think it was a nineteenth century wag who when asked to state the positive, comparative and superlative forms of the word, 'lies' replied wittily 'lies', worse lies and statistics. The wit was obviously tinged with a certain amount of malice. Nevertheless statistics like any other science in which personal bias or personal prejudice may play a part, has pit-falls for the unwary. Even such a simple process as the enumeration of a population may be falsified. The recent Annual Report of the Health Officer of the city of Madras provides an instance in point. Three widely different figures emerge as the population of the city. The Commissioner of the Corporation estimates it at 13 lakhs. The rationing authorities estimate it at 15 lakhs. The Director General of Statistics, Delhi, mind you, estimates, the mid-year 1948 population at 9,63,087. If this is true, from the statistical point of view, the last estimate is perhaps the most surprising, but it may be useful for sounding a note of warning. If any person undertakes to state the population of India or the city of Madras on any date or the numbers who died of tuberculosis in any year in this country, correct to the last unit's place, I suggest that you should take such information with a very large pinch of salt indeed. And when the figures are stated to be "estimates" there can be no justification for giving them in such a misleadingly precise form. The figures of the rationing authorities obviously over-estimate the population. When the amount of the food ration depends on the number of adults in a family, commonsense must tell us that there will be a temptation to exaggerate the numbers or at least to return some of the children at border ages as adults. If the ration of sugar depends on income of the householder then, obviously, the income will be exaggerated. If on the other hand, you ask, for a return of income for the purpose of income-tax or professional tax under-estimates of incomes may be expected. Such a phenomenon is not peculiar to our country alone. Other countries have had similar experiences. To avoid such errors the Bureau of Census Statistics in United States of America makes clear that the information supplied in the census schedule will be treated as strictly confidential and will not be made use of for purposes such as taxation adversely affecting individual interest. Nor is such bias limited to the common citizen. Look into the annual return of any hospital. You will find that the figures of patients cured and patients discharged show a tendency to be exaggerated as against the figures of mortality from the disease inside the hospital, and this from the best of motives, the protection of the reputation of the hospital.

The search for methods of avoidance of bias and errors of all kinds is almost the first and last problem of statistics in the social field. For, if the information gathered is false at its source no machinery of science or logic can grind out true and sound conclusions as its end-product. We must constantly keep in mind the fact that the population of a country and its many features are never static but always dynamic. Every minute, no every second, children are born, men and women get married, in some parts of

(Continued on page 118)

WHAT A BLESSING IS SLEEP !

by

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"Come Sleep, O Sleep, the certain knot of peace
The baiting-place of art, the balm of woe,
The poor man's wealth, the prisoner's release,
The indifferent judge between the high and low".

Sound sleep is indeed one of the greatest of gifts that Sweet Nature has conferred upon us. But alas! how few there are who are really enjoying this bounty?

Many of the ills and ailments that this flesh is heir to, and that have made so large a part of our lives, are due to the cause of sleeplessness. We have not been able to adhere to the laws of Nature either by force of circumstances or ignorance. But Nature does not pardon us for this transgression as it is the primary duty of everyone to know and observe this law as "ignorance of law is no excuse". Nature demands implicit obedience to her unchanging and unchangeable law. Only the right deserves the Fair.

Everyone needs rest and repose. After a day's labour, the farmer from his plough, the workman from his tools, the sedentary worker from his desk, and the scientist from the laboratory, and others from their several different avocations, all seek to recreate and refresh themselves through the process of sleep to make good of their lost energies for their next day's journey through life. If the body and mind are not made fit enough by a preliminary course or recreation, it would be difficult to induce sleep. If the wasted energy is not recouped and when the reserves are also used up gradually the time may come to make a halt when it would be no longer possible, to continue his march with his feeble stock of energy. Any recourse to artificial methods, will not be of much avail and ultimately, he will only become so helpless as to cry his woe and misfortune. This is not anybody's fault but his own. The fault lies in his not heeding the signal of the approaching danger. Nature is very lenient to us. She gives a fairly long rope. If we do not heed in time and take suitable steps to avoid the pitfall, we have got to pay the penalty. Sleeplessness is the first penalty he has to pay for his transgression of Nature's Law.

If we want to be saved from this disastrous consequences, we must follow Nature's simple commands for our greatest good of the greatest

number. No doubt we are living in the present world under great stress and strain and our life is quite different from that of our forefathers The life persists in death.

But yet, we can survive this hardship and struggle and make our lives sublime and worth living provided we do not tresspass Nature's laws which are but few, simple to understand and easy to follow:

1. He should engage his body and mind in some sort of recreation, altogether different from his daily avocations;
2. He should avoid late heavy meals during nights, and he should take a walk after meals so that the food taken may get settled in the system before its further action.
3. He should sleep in good ventilated room with congenial surroundings.
4. He must go to bed early to rise early.
5. Above all, he should school and discipline his mind and nerves by repeated efforts and exercise to the habit of sleep at will.
6. He should not carry his worries and cares into his bed room.

If these are observed and followed by gradual application and training, the mind and body will be so tuned to a regular habit of sleep, which is the *sine quo non* of Sound Health. These are some of the broad lines on which the individual must shape his health habits to suit his own conditions of life and living.

After a good night sleep, one rises up early next morning like a lark to sing the song of life!

Jai Hind.

(*Continued from page* 116).

VITAL STATISTICS

the world new settlers-immigrants are arriving. Similarly every moment the population is reduced by deaths or by person leaving the country. Inside the population itself, some are recovering from illness while others are falling ill. The picture is thus an everchanging one.

Even before you have, for instance, finished a census operation, the facts will have changed. The census may thus be compared to a snap-shot picture and the importance and usefulness of the census arises out of the study of the changes in population conditions over a series of censuses. This, undoubtedly, is one of the reasons why population studies are amongst the most interesting subjects to student of Economics and Sociology.

I have said enough, I hope, to interest you in this vital subject. I have deliberately avoided the use of many figures in this talk and devoted myself to explaining rather the nature and importance of Vital Statistics. Those who wish to pursue the subject can get all the materials that they need from the Census Volumes and the Annual Administration Reports of the Government of India. But, perhaps, the most interesting and instructive way would be to take the city or district in which you live and to gather the available statistics yourself. You will then be able to see the merits and defects of the existing information and to consider how the defects may be remedied and the merits enhanced.

We are to-day free citizens of a New Democracy and its progress and success depends on the intelligent interest that we the ordinary citizens take in the collective problems of our common land. And nowhere is such interest more essential than in the field of Vital Statistics.

DIET THAT GUARDS AGAINST CANCER

by

James Lar-sen

More is known about cancer than the average layman might suspect.

Unfortunately this knowledge is still confined to what medical scientists call the " fundamental nature " of the disease. It is still as difficult as ever to treat, but many scientists think the real hope for a cure lies in continuing the research which has provided a basic knowledge of the disease.

Work with drugs, surgery and radiation should not be discontinued. A miracle cure is a possibility. New and improved treatments can certainly be developed. But eventual victory over the disease, they say, most likely rests in work to reveal why cancer starts and how it results in the ' outlaw ' characteristics of cancer cells.

" HEALTH HINTS "

Research has also provided some sound " health hints " for cancer prevention. One such hint is understandingly simple, and has shown itself to be strikingly effective in work with laboratory animals. It is also supported by actuarial tables—those statistical devices used by insurance companies to determine life expectancy.

The hint is this ; don't eat too much. Go very easy on carbohydrates. Get plenty of exercise. Don't eat between meals, but make sure you get the requirements in vitamins, minerals and proteins.

This doesn't mean that the old stand-by in cancer prevention, " Avoid chronic irritation," can be thrown out the window. Not by any means. It simply states that hidden irritations and other cancer—causes whatever they may be—stand less of a chance of raising havoc if the body is not so well supplied with food and energy substances that young cancer cells get a good start in life.

CERTAIN CHEMICALS CAUSE CANCER

Not many years ago scientists found that certain chemicals would cause cancer in laboratory animals—cancer which was similar in every respect to the human disease. They could cause cancer at will. This discovery is probably the most important single item responsible for recent advances in man's knowledge of the disease.

What have scientists learned from using these chemicals ? Medical men at the McArdle Memorial Laboratory for Cancer Research at the University of Wisconsin and at the Michael Reese hospital in Chicago have conducted the experiments which may become the classics in cancer prevention through proper diet.

A particular yellow chemical, known as benzpyrene, will give 72 of 100 well-fed mice cance of the skin within six months. Now this is what's important—if those 100 mice had been fed 40 percent fewer calories during that time only 10 would have acquired cancer. The rest would have had no tumors at the end of the six-month period.

CANCER RESISTING DIET

The diet fed the cancer—resistant mice is composed of a full quota of vitamins, proteins, minerals and fats—but they got little more than half as many calories through reducing the quantity of carbohydrate foods.

This experiment has been performed many times with the same result. Variations in the amount of protein eaten by the mice had no effect on cancer formation, nor did restriction of vitamin B-2, riboflavin, to the minimum level needed for health. But more about vitamins later.

One other thing. Calorie restriction has no effect on cancer once it has started. It only retards cancer formation.

Does this apply to humans? Apparently yes, from the evidence now on hand.

OVER WEIGHT AND CANCER

Life-insurance records have shown that people who were overweight at the time they took out insurance were more liable to contract cancer in later life. Now "overweight" doesn't mean in this case, more pounds than the natural average for age—it does mean, however, more pounds than necessary for basic body size; too many pounds of flesh for the size of the skeleton A person with a big 'frame' will naturally weigh more than average, yet he might not be overweight.

Cancer is also more prevalent in the temperate climates where diets are high in carbohydrates.

Many cancer specialists believe the change in ways of living since 1920 is a cause of the increase of cancer; an increase of 35 per cent since 1930.

The increase is in no way accounted for by greater accuracy of medical diagnosis (with 'More' cancer cases simply because they aren't diagnosed as some other disease), by the population increase (seven per cent), or by the fact that more people survive into the upper age groups where cancer begins to take a greater toll.

OVER NUTRITION AND UNDER EXERCISE

Medical men believe that in many instances the "diseases of old age" are caused primarily by modern-day over-nutrition and under-exercise. Heart disease is the only life-taking competitor of cancer in upper age groups. Both are increasing. It is well known that hearts grow untrustworthy in bodies that are too well fed and under-exercised. They are good hunting grounds for cancer, too.

Translated into practical terms, the research conducted at McArdle and the other laboratories means, briefly, that one of the things which play a role in the development of cancer is over-eating. Alone it will not cause cancer, but over-eating by persons with a tendency toward the disease, through inheritance, chronic irritation, or possible unknown influences, will increase the possibility of contracting the disease.

AN INTERESTING SIDE-LIGHT

An interesting side-light on the research is this: the mice fed just enough, and no more, are extremely energetic alert, and in better general health than those who get as much as they want. They may not be as happy—always searching for food—but they are, one might say, more "ambitious."

How does over-eating affect cancer formation? A few of the subtle changes that occur while cancer is getting its start must be explained before this can be answered.

Cancer does not develop as a single, continuous, process. Rather, it makes headway by jumps. Scientists divided the stages into the "period of induction", the "critical period", and the "period of progression."

The first is essentially a pre-cancerous stage. The scene has been set. It is incompletely understood because changes take place in the microscopic cells of the body, too small for easy study.

It is believed, however, that a single abnormal cell is formed, due to a lack of normal proteins or a change in the protein content of the cell itself. In humans, according to Dr. H. P. Rusch, Director of the McArdle Laboratory, the change

probably results from a combination of a hereditary tendency toward the disease together with a disturbance in hormonal control, plus other factors as yet not known.

Under usual conditions cancer won't develop even though the " period of induction " exists. Irritation of the cells or the tissue of which they are part will, however, send them tottering over the brink into the cancerous—or critical stage.

At the start of the critical period only a few cancerous cells are present. Since they aren't yet established they do not have a direct blood supply. They must compete with healthy cells for food from the fluids in the tissue spaces.

Here is the encouraging aspect of the situation ; the surrounding healthy cells have a better chance of survival. Growth requirements for tumour cells are somewhat different than for normal cells.

If it weren't for this difference, scientists say, the human race might have died out long ago from cancer.

FAVOURABLE ENVIRONMENT

Continued irritation is one thing known to create a favourable environment for young cancer cells. The body reacts by sending food to the irritated spot, starting a chain of reactions to heal the damaged tissue. Cancer cells will grow in this environment. When the tissue is healed, the normal cells naturally stop growing—but the cancer cells don't. They continue, with typical wild, unchecked proliferation.

The length of the critical period varies for different types of cancer. It may last for days or months.

The third period, progression, is the one during which cancer is detected by the patient or physician. The cancerous cells have multiplied, have a blood supply of their own, and have conquered the forces that normally hold them in check. A tumor makes an appearance.

Now where does diet come in ; during the critical stage, when cancerous cells are competing with normal cells for food. If there is only enough food for the normal cells—and no more—the cancer cells will be starved. If there is an abundance of carbohydrates available, they will grow,

BLOOD SUGAR AND CANCER

This doesn't mean the body's supply of energy foods must be kept constantly low. The blood sugar content always rises after a meal, and if it declines to a low level between meals the cancer cells will never get a start. Large reserves of energy which carry the high blood sugar content along between meals make ideal conditions for abnormal cells beginning to grow. In short, overweight people fall in this class. So do those who always lunch between meals.

Of course, diet control isn't a *sure* preventive for cancer. Scientists know little, or possibly nothing, about other factors. But it works with 90 per cent of the mice in the McArdle Memorial Laboratory, and mice have physiologies similar to humans. And it shows up beautifully on the insurance tables. It's by far a better than—even gamble.

There is a host of factors, Dr. Rusch points out, needed to make the 'background' favourable for cancer formation ; there is another host which, given the proper background, will initiate cancer—and still more which influence the grouth of the first small nest of tumor cells.

Dr. Rusch's associates, among them Dr. Van R. Potter, are trying to find what makes cancer cells so different from normal. Cancer tissue, they know, is made up essentially of very primitive cells. A liver cell, becoming cancerous, will lose the characteristics that make it a liver cell—it will slip back to a very basic, non-specialised type. It loses some of the enzymes that let it function as a normal liver cell. To use a comparison, it loses some of the chemical 'morals'

that previously kept it from becoming an outlaw.

CARBOHYDRATES AGAIN

Cancer tissue cannot burn food—carbohydrates again—as completely as normal tissue. Like an improperly adjusted oil lamp, its flame will "smoke" and throw half-burned materials into the body. It is believed these materials act as growth stimulators, further encouraging the cancer cells. They also act as a poison for normal tissue.

Apparently riboflavin—vitamin B-2—will inhibit the formation of some types of cancer. It has been found that Bantu Negroes, an African tribe, which lives on a diet deficient in riboflavin, are apt to get liver cancer. About 50 per cent of cancer in the Bantu tribe is liver cancer. Dr. Rusch has found that rats fed on a high level of riboflavin are less likely to get liver tumors from a cancer—producing chemical known as an azo dye.

NO CURE IN SIGHT

Unfortunately there is no cure for cancer yet in sight. Surgery and radiation are excellent treatments, but not always positive cures.

A diet high in the needed vitamins, minerals and proteins—but with an abosulte minimum of carbohydrates—has been shown clearly to be at least part of the cancer-prevention answer.

Though somewhat sceptical at first, *the Journal of the American Medical Association* recently stated : "There seems to be little question that a calorie restricted diet both reduces the incidence of tumors and delays their time of appearance. . . Any degree of calorie restriction may exert some inhibitory effect on the formation of tumors; however, the lower the calorie intake, the greater the inhibition . . . . Probably avoidance of overweight, besides being of value prophylactically in diabetes, heart disease, and arthritis, may aid in the prevention of many types of cancer occurring in man or at least, delay the onset."

If humans get enough protein they need have no fear of getting too few carbohydrates. The body will turn protein into energy whenever it needs to—and it should, to maintain stamina—be required to conduct this process constantly.

The old race-track adage, "Bet on the lean horse" also applies to humans. The thin runner will chalk up the faster mile; he is also able to run further. Now it is evident he's less apt to acquire cancer.

It is a rule of general health, not only of cancer prevention, that leads Dr. Rusch to say: "The best advice to be given is to keep physically fit, avoid over-eating, eliminate chronic irritation, and secure periodic medical check-ups."

He doesn't prescribe starvation—just extreme moderation where carbohydrates are concerned.

—*Science Digest.*

CANCER

". . . In every province, including Burma, the incidence of cancer of cervix falls heaviest on Hindu women. The incidence of buccal cancer falls heavier on the male than on the female and on Muslims more than the Hindus. This form of cancer has its lowest incidence in the Punjab, where *pan* chewing is not indulged in to the same extent as in other parts of India. Unhappily this habit is growing rapidly in that province as well. . .

" In the whole of this enquiry the ætiological roll of irritation in the incidence of cancer has stood out prominently. Whether it was the cervix, the oral cavity, the penis, the skin or the gastro-intestinal tract, the factor of irritation seems to excel all other possible causes and brings he problem of this fell disease within the scope of preventive medicine."

(*Bhore Committee Report*—Chapter IX)

WAIT TILL I FINISH MY BOTTLE!

Dr. Radcliffe, being in a tavern one evening, a gentleman entered in great haste, almost speechless: "Doctor, my wife is at the point of death, make haste, come with me".

"Not till I have finished my bottle, however", replied the doctor.

The man who happened to be a fine athletic fellow, finding the entreaty useless, snatched up the doctor, hoisted him on his back and carried him out of the tavern. The moment he set the doctor upon his legs, he received from him, in a very emphatic manner, the following threat: "Now, you rascal, I'll cure your wife in spite of you."

"*The Wits*" Vade-Mecum.

* * *

WHY SOME CALL IN A DOCTOR?

Many persons call a doctor when all they want is an audience.

The Speaker's Desk Book.

* * *

HAPPINESS OF INFANTS AND BRUTES

Perfect health and spirits . . . is an enjoyment (which) probably constitutes in a great measure the happiness of infants and brutes, especially of the lower and sedentary orders of animals, as of oysters, periwinkles, and the like, for which I have sometimes been at a loss to find out amusement.

Paley–Moral and Political Philosophy.

* * *

VALUABLE OF ALL POSSESSIONS

Health is the greatest of all possessions; a pale cobbler is better than a sick king.

Bickerstaff.

* * *

WHY THEN LABOUR?

He destroys his health by labouring to preserve it.

—*Vergil.*

* * *

HAPPIER WORLD

The world would be happier if its leaders had more vision and fewer nightmares.

* * *

DEDICATION

"To my fellowmen a heart of love; to my God a heart of flame; to myself a heart of steel".

Augustine.

* * *

SOCIALLY DEAD!

Early to rise and ditto to bed makes a man healthy, but socially dead.

* * *

IT DOES COST

Doctor: I hope you took my advice to sleep with all doors and windows open.

Patient: Yes, doctor.

Doctor: I am sure you are rid of your heaviness in head and insomnia.

Patient: Yes, doctor, and also my purse, watch, and other valuables.

* * *

WAY TO BETTER HEALTH

People would have better health if they would remember the stomach is a work-room, and not a playhouse.

* * *

WHO IS AN EXPERT ?

"An expert is one who knows more and more about less and less"—*Nicholas M. Butler.*

* * *

PHYSICIAN'S APHORISM

The healthy know not of their health, but only the sick : this is the physician's aphorism.

—*Carlyle—Characteristics.*

* * *

TRAIN SICKNESS

A man got off a train one day, green in the face. A friend who met, asked him what was wrong. "Train sickness," said the traveler. "I'm always deathly sick when I ride backwards on a train." "Why didn't you ask the man sitting opposite you to change with you?" asked the friend.

"I thought of that," said the traveler, "but there wasn't anybody there."

* * *

WHAT PULLING OUT TEETH DOES ?

Removing the teeth will cure some things, including the foolish belief that removing the teeth will cure everything.

* * *

HOW BUSINESS GROWS ?

The eye specialist's consulting room was crowded.

"Is it always like this"? asked a friend.

"No, only when there is a bad film in our local theatre."

* * *

WHO IS UNHAPPY ?

Unhappy is the man who is not so much dissatisfied with what he has as with what the other fellow possesses.

—*Channecey M. Depero.*

COMMONSENSE

The foolish and obtuse are often deceived by others ; the shrewd and quick are often deceived by themselves. Without that best of all qualities of mind, commonsense, there is little to choose between the two.

—*G. P. R. James.*

* * *

THE NOBLEST LEGISLATIVE ACHIEVEMENT

"The great work of sanitary reform has been, perhaps, the noblest legislative achievement of our age, and if measured by the suffering it has diminished, has probably done far more for the real happiness of mankind than all the many questions that make and unmake ministries.

—*Lecky.*

* * *

EVEN BEST FRIENDS FALL OUT

Health specialists say that his hair and his teeth are man's best friends, but even the best of friends will fall out.

* * *

THE GUILTY ONE

Dyspepsia is the remorse of a guilty stomach.

—*A. Kerr.*

* * *

SECRET IS STILL A SECRET!

It is gathered from many articles printed that the secret of health is still a secret.

* * *

SOUND DETAIL

There is no good architecture without sound detail and no sound detail without proper specifications for the plumber.

* * *

FOUNDATION FOR CIVILIZATION

Take care of sanitation and civilization will take care of itself.

FROM EVERY WHERE

WHAT DO THEY SAY ABOUT IT?

Readers can contribute to this section. They are requested to send extracts of current literature which, in their view, would interest the people. —Ed., P.H.

THE FINE ART OF DIAGNOSIS

"As Dr. Blank concluded his lecture a woman rushed up to him. "Doctor," she said, "I've wanted to shake your hand and thank you ever since you saved my life two years ago."

"When was that?" asked the doctor politely, taking her hand and trying to remember her face.

"I was in the hospital and they had all given me up," explained the woman. "No one seemed to know what was the matter with me. Then one day you came into my room with some other doctors, took just one look at me and diagnosed my case instantly. I began getting well from that hour, and you can see I'm perfectly all right now."

"That's very interesting," said the doctor, still at sea. "I diagnosed your case with one look? What did I say?"

"It's funny, but I can't remember the exact word. It began with an 'm' and was three syllables. I meant to look it up, but I never did."

The doctor thought a moment. "Was it 'moribund'?"

"Yes," cried the woman delightedly. "And I began to improve the moment you said it!"—

—*Contributed by Agnes Rothery.*

"Doctors still talk about the time some years ago when Edward Strecker, professor of psychiatry at the University of Pennsylvania, cured an apparently hopeless case of schizophrenia before his students' eyes.

Dr. Strecker was leading a half dozen psychiatrists-in-the-making on ward rounds in the Pennsylvania Hospital's Department for Nervous and Mental Diseases. They came to the bed of Laura, who had been in the hospital more than 15 years, incessantly seeking to curl herself into a ball. She would not eat unless forced, and had not uttered a word for three years. "As characteristic of her disease, Laura has split herself off from the world of reality," Dr. Strecker explained. "We do not know what caused her to do so, but, according to Freud's theory of

schizophrenia, she has regressed to an infantile state and is seeking to resume the fetal position." Just then a nurse called Strecker to the telephone.

Laura raised her head and watched him leave. Then she spoke her mind: "Did you ever hear such damn nonsense in all your life?" As her answer, she proceeded to make a rapid recovery, and was out of the hospital in a few weeks. She lived a normal life until she died ten years later of heart disease.

—Greer Williams in *The Saturday Evening Post.*

A NEW WAY OF LOOKING AT ILLNESS

A new approach to disease is spreading through the medical world. Doctors call it psychosomatic medicine.

They might have found an easier word, and they probably will, But psychosomatic makes sense, because "psyche" means mind, and "soma" means body, and psychosomatic means the effect of the mind and the emotions on the actual physical condition of the body. This turns out to be considerable.

Repressed or distorted emotions can cause or aggravate not only high blood-pressure and ulcers and asthma, but also indigestion, heart trouble, eczema and a dozen other diseases.

Just how the emotions affect some of these ailments, nobody quite knows yet. That they do affect them, and a good many more besides, scientists are beginning to be quite sure.

* * *

What is wrong with these people is not their bodies at all but their approach to life. Something is eating away at their minds and their emotions, some conflict or desire that they cannot admit and cannot cope with. As their minds and emotions are unequal to solving whatever the problem is, they pass it on to the body.

* * *

Psychosomatic experts are convinced now that high blood-pressure which you can measure, asthma which you can see and hear, glaucoma which by a mysterious increased pressure within the eyeball, causes thousands of cases of blindness every year, and ulcers which may have to be operated on, can—they don't yet say must—develop from a deep-seated and long-lasting emotional tension wearing on the body until it actually causes physical changes.

(The 'Strand' Medical Writer.)

SUPERVISION OF SANITATION IN STATE PARKS

V. M. Ehlers, Chairman of the Committee on the Promotion of Environmental Sanitation. *American Public Health Association Year Book* 1936–1937. pp. 162–63.

The data secured by sending questionnaires to the State health officers is given.

It was found that during last year the number of State parks had increased from 450 to 682.

The Committee recommends:

"(*a*) that a specific department of the State Government be given administrative authority over the development and maintenance of State parks; (*b*) that a sanitary engineer be employed by the above department and, if this is not possible, then an arrangement be made with the State department of health whereby sanitary engineers of that department will be charged with planning, designing, and general supervising of all major sanitary projects; (*c*) that all plans for sanitary projects be approved by the State health department; (*d*) that periodic inspections of the park be made by representatives of the State health departments; and (*e*) that a trained custodian or superintendent be in charge of each developed park and (*f*) that proposed sites for hotels, lodges and camps be approved by a sanitary engineer."

—(*P. H. Engng. Absts.*)

MRS. SANGER ADVISES ON FAMILY PLANNING

In an article written for the magazine *Women United,* Mrs. Margaret Sanger says:

"From my own experience and observations of the long fight for birth control and family happiness, I have reached these conclusions:

"Parents should avoid having children if either parent has a transmissible disease because no mother or father wants to see their children helpless, devoid of physical or mental development.

"Every child should be spaced from two to three years to insure the living child nourishment care, love and a place in the affection of its parents before another comes to take from it its natural inheritance.

"Young people should marry early but postpone parenthood for two years after marriage to secure a firm foundation of love and companionship in marriage before they usher a new life into being to share that environment.

"Fewer children, better and healthier children in any family, help to establish higher standards and bring peace on earth, goodwill to men over the entire face of the globe."

ANTISEPTIC SEA-WATER

Some challenging problems are raised by recent studies of Ketchum, Carey, and Briggs on the viability of colon bacilli in sea-water. These investigations, conducted at the Woods Hole Oceanographic Institute, have brought out two major points.

In the first place, the observers have found that, when sewage is discharged into tidal estuaries, the reduction of coliform organisms is much more rapid than that which could be accounted for by dilution (the dilution being measured by changes in salinity).

In the second place, the investigations showed that, when sea-water was inoculated with *Escherichia coli,* the colon bacilli died off at a reasonably rapid rate, over a tenth of the initial population disappearing in each 24 hours so that in a week the number left was infinitesimal. When the sea-water was boiled, the same result was observed. The striking new fact was disclosed, however, that, when the sea-water, instead of being boiled, was autoclaved for 10–15 minutes, the rate of reduction was slowed down to one-twentieth of its normal rate, so that the first 10 per cent reduction was apparent only after 20 days. The authors are inclined to attribute this phenomenon to the presence of antibiotic or other antibacterial substances, which are destroyed by autoclaving but not by boiling. It would seem equally plausible to assume that the mortality of colon bacilli in ordinary sea-water is due to lack of necessary foodstuffs (rather than to toxic effects); and that the process of autoclaving produces split products which enable the colifom bacteria to maintain themselves more efficiently.

—(*A. J. P. H.*)

EATING AND SLEEPING ESTABLISHMENTS AFFECTED BY THE NEW SANITATION LAWS:

Virginia Health Bul., 1, 5–7 (July 1948).—"............a new program designed to ameliorate insanitary conditions in sleeping and eating places within Virginia" has been "inaugurated as a result of the four sanitation laws passed recently by the General Assembly." Senate Bill 141 increases emphasis upon cleanliness in restaurants and other eating places. All will be required to possess an unrevoked permit from the State Health Department. To obtain the permit, rigid sanitary obligations must be met. Bill 50 covers hotels, tourist courts, and tourist homes. Each lodger will be assured "a safe water-supply, an approved sewage disposal system, and adequate lavatory facilities' including his individual bar of soap and towels.', Bill 142 covers service stations and similar establishments. The Bill states that they must

provide toilet facilities, an approved sewage disposal system, and a safe water supply. Bill 46 covers the sanitation of trailer camps. It requires 1,000 sq. ft. of ground, exclusive of that under the vehicle, a safe water supply and approved sewage and garbage disposal systems which are to be conveniently located. Enforcement of these laws will be under the direction of the State Health Commissioner and his duly designated officers. Operators, failing to comply with the law which constitutes a misdemeanour, will be punished by fines, by revocation of their permits, or by both upon conviction.

Dade W. MOELLER
—(P. H. Engg. Absts.)

IMPORT OF IRON LUNGS

Poliomyelitis and iron lungs formed the subject-matter of a number of supplementaries at question-time in Parliament on December 2, 1949.

Mr. Satyanarain Sinha, Minister of State for Parliamentary Affairs, answering on behalf of the Health Minister, said that five iron lungs had arrived in Delhi and 15 more were expected. The cost of the iron lungs would be met from the United Nations International Children's Emergency Fund's allocation to India. Each iron lung was estimated to cost 1,100 dollars.

Mr. Sidhwa : Have any lungs been sent to Bombay ?

Mr. Sinha : They came *via* Bombay. (Laughter). If required in Bombay, they will be sent.

Mr. Kamath : Is this disease new to India or have any cases occurred in the past ?

Mr. Sinha : It has been discovered recently. (Loud laughter.)

Sardar Hukam Singh : Were any of the lungs used in treating patients ?

Mr. Sinha : Four deaths occurred before the iron lungs arrived. Since their arrival, there has been no occasion for using them.

Mr. Ananthasayanam Iyengar : Is the Ministry aware that there is a drug in South India which is useful for infantile paralysis, which is the name for this disease, and whether attempts have been made to utilise it ?

Mr. Sinha : The Department has no information.

According to a statement laid by the Minister of Health on the table of Parliament there were 85 deaths and 611 attacks of the disease in different places in India, Bombay city with 66 deaths and 412 attacks during the period January to 15th October, 1949, showed the highest incidence. In the case of other Bombay Towns, the figures from September 1 to October 15, were twelve deaths and 96 attacks, Delhi registered for the period July 1 to November 1, 15 deaths and 42 attacks.

—P. T. I.

THE HUMAN PROBLEM OF URBAN DISPERSAL

The path to dispersal will be smoothed considerably if we realize in advance that the legitimate social desires of metropolitan man need not be flouted and forgotten in a programme of dispersal. His desire to be at the centre of national life, his desire to merge his smaller self into some larger civic whole, in order to overcome that loneliness and insecurity which is always so marked in a great age of transition, his desire for a multitude of social stimuli, as well as a wide variety of economic opportunities, all can be translated into the more open pattern of working and living that the new towns will provide. In due measure, at due intervals all the human requirements of metropolitan men can and should be met. Instead of a single Stratford or Malvern Festival, every group of garden cities, should have a cycle of theatre and music festivals, as well as their own cycle of sports ; and the normal results of dispersal, provided the movement is conceived on a regional and national scale, should be a

richer rather than a poorer life, even in the very terms that the metropolitan man himself most values, though alas! all too rarely fulfils.

(Lewis Mumford in "*The American City*.")

HICCOUGHS FOR 265 DAYS

After eight months' hospital treatment at St. Catherine's Ontario, Rose Bacon has left the hospital still hiccoughing. However, the rate of her hiccoughs has been reduced to 35 a minute. Previously following a severe operation in February, she had been hiccoughing at 67 a minute.

The only possible explanation the doctors could give for this 265 days non-stop hiccoughing was that it was due to her nerves. She is warned not to get excited, as that accelerates the rate of her hiccoughing.

(*Sunday Times*, 4-12-49.)

SANITARY STANDARD FOR SUBURBAN DWELLINGS

Joseph L. Quinn, Jr. Monthly Bul., Ind. State Board of Health, 44, 107 and 118 (May 1941).

Forty years ago the farmer went to town to get typhoid fever. To day the city dweller goes to the country to contract it. With the intensified use of suburban property for home sites with poorly located and inadequately constructed water works and sewerage systems, outbreaks of filth-borne diseases are likely to occur.

"Sanitary Standards (Minimum Requirements) for Suburban Dwelling" to serve as a guide can be obtained from the Indiana State Board of Health.

—*Joseph L. QUINN, Jr.*

(*P. H. Engng. Absts.*)

ONE-SHOT CURE FOR V. D MODERN MEDICAL MIRACLE

"A new drug, procaine penicillin in oil and aluminium monostearate, has been given to nearly 100 patients at the Venereal Disease Research Laboratory of the United States Public Health Service on Station Island, and 12 different kinds of tests have shown it to be successful. It causes no discomfort, has no after effects, takes as little as three days to kill the germs, costs 48 cents, and can be administered in a moment. The same injection will cure syphilis and gonorrhœa. One single shot of this fluid has destroyed the venereal organism in the human body. It is a cure so simple that every doctor, not just expert specialists, can apply it; so quick that no hospitalization is necessary; so safe, cheap and painless that no patient need shy away from it—a treatment that can cure the victims of the disease faster than the germs can claim new ones".

—"*Colliers*" (*U. S. A.*) of July 2, 1949.

INDIA'S FOOD PROBLEM

EGGS

Next to milk, eggs are a perfect food. Increase in the production of eggs can be achieved by better methods of poultry farming. Poultry farming should be organized on modern lines and better kind of hens bred to lay more eggs. This work may also be taken by commercial firms. Government is trying to increase poultry farming as much as possible.

FISH AND MEAT

Fish and meat form an article of diet for a great many of our people, but the quality of meat is not quite so good as the cattle used for meat are not well fed. In India no special effort is made to rear cattle specially for meat, as is done elsewhere, in countries where meat is a staple article of diet. It would be better if this is done for it would thus provide better quality of meat.

India has a long coastline and many kinds of marine fish are available for food. A number of provinces situated on coastal areas use fish for food. Fish is also caught from rivers and tanks. In spite of the great scope of fisheries development in India, work was not so fully developed. The Government of India and various Provincial Governments and States have recently taken the work in hand and a Fisheries Department is being organized to increase the yield.

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